IDG.net

SALARY SURVEY See page 42

$113,000 Average salary for CIOs

$27,000 Annual bonuses at the top

$10,000 Webmaster signing bonuses

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SEPTEMBER 6, 1999 ▪ VOL. 33 ▪ NO. 36 ▪ $4 A COPY

USERS HIT 'PAUSE' IN RUSH TO WEB

E-retailers take time to nail down virtual shelves, service

BY JULIA KING

He who hesitates may turn out to be the long-term winner online.

So goes the wisdom at a growing number of retailers that are putting the brakes on fast-track Internet shopping sites to bolster behind-the-scenes inventory, shipping and customer service systems.

E-COMMERCE

One of the most recent examples is The Home Depot Inc., which ditched plans to start selling a limited number of products online this fall [News, Aug 23]. Instead, the Atlanta-based retailer will work on integrating computer systems that enable it to offer a broader selection and more services — such as online ordering

E-Retailers, page 99

Finishing back-office rollouts comes first for ERP managers

BY CRAIG STEDMAN

Enterprise resource planning vendors are scurrying to link their applications to the Internet and e-commerce technology. But for many users, the top priority remains more mundane: just getting a modern back-office system fully in place.

A half-dozen users in that position said they're interested in the emerging Internet plans of ERP vendors such as Germany's SAP AG and Pleasanton, Calif.-based PeopleSoft Inc. Both companies announced Web-based software last week.

But those users said that before they can even start thinking of tying an ERP system to the Web, they have to finish their back-office rollouts.

ERP, page 99

RANDALL SCOTT

BOEING JOINED THE W3C so it could get an early peek at Web developments and influence them as a user, says Ann Bassetti, Web products manager at the giant aerospace company, which has more than 2,000 Web servers

INTERNS: FOR SUMMER AND BEYOND

Once cheap labor, but now key to future ranks

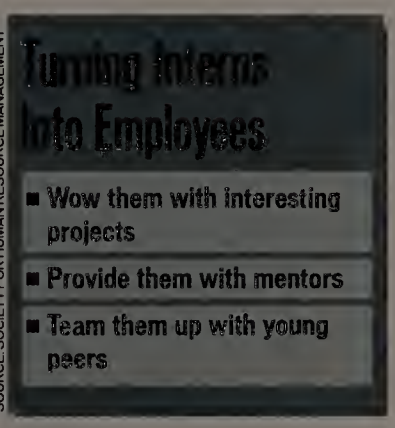
BY STEWART DECK

It's back-to-school time for students of all ages, including those fresh-faced summer interns who have been doing research, building models and testing code in information technology departments across the country.

And even though those summer helpers may have been working on complex projects, their departures shouldn't cause too many headaches for already overtaxed IT staffers, company officials said. That's because of the way internships are now viewed: as a recruiting tool instead of as cheap, entry-level labor.

"Most companies are now using internships to plant seeds for the future, instead of

Interns, page 16



SOURCE: SOCIETY FOR HUMAN RESOURCE MANAGEMENT

HANDHELDS TIED TO MAINFRAMES

Software allows mobile access to back-end data

BY MATT HAMBLEN

Handhelds, say hello to the mainframe.

That's the introduction being given this week as Avant-Go Inc.'s Enterprise 3 software takes connections between handheld computers and corporate databases another step forward.

The new release by the San Mateo, Calif.-based company

Handhelds, page 14

WORLD WIDE POWER

WEB STANDARDS

TIM BERNERS-LEE and his World Wide Web Consortium are making decisions now that will determine the capabilities of corporate Web sites for years to come. The group's technical specs, such as XML, will give the Web a second-generation architecture that could eclipse even the Web's phenomenal success of the 1990s, reports Gary H. Anthes. But despite widespread praise for its work, the W3C draws some criticism for its method and concentration of power at the top.

See page 74

NEWSPAPER

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and pennies at the same time?

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Compaq ProLiant Rack Servers starting at
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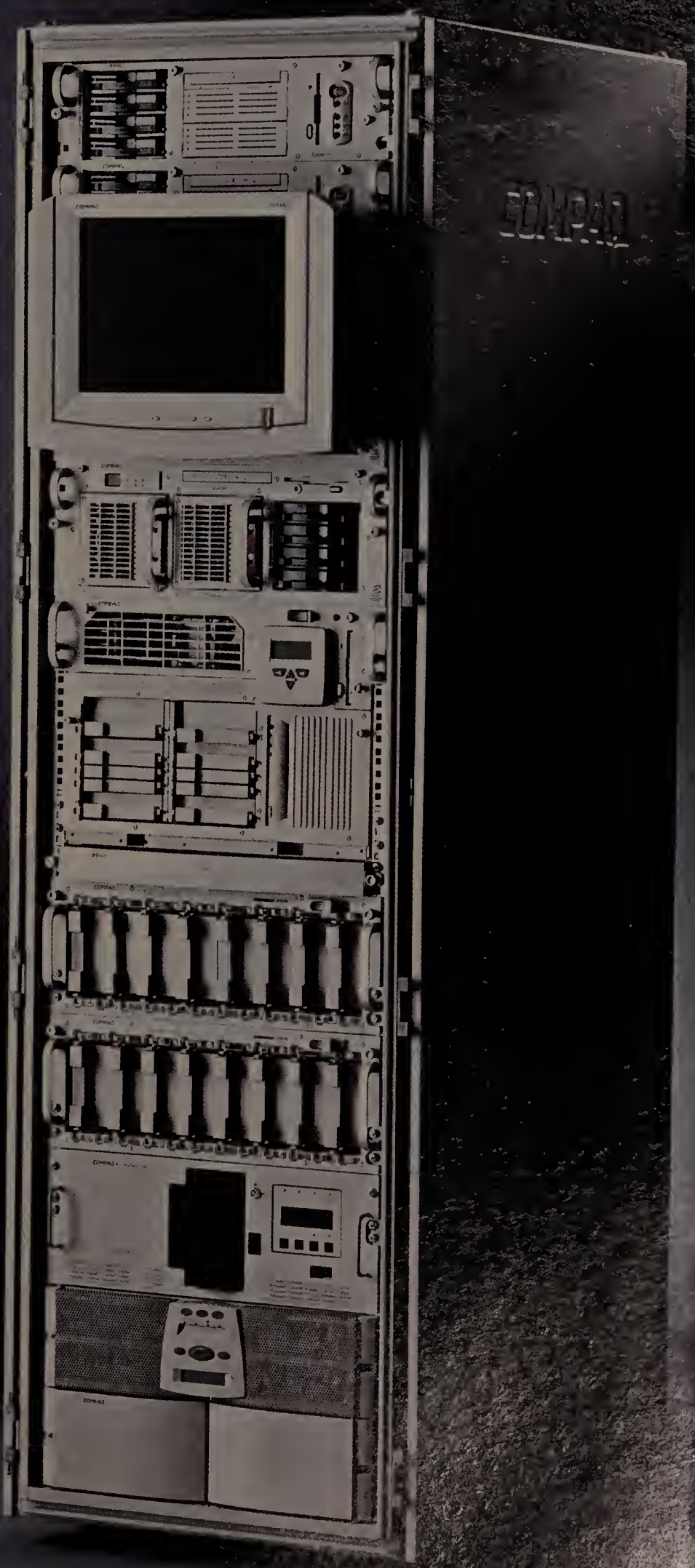

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- Choice of performance SCSI storage, including 18 GB[5] 10,000 rpm Wide-Ultra2 SCSI drives
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- Choice of performance SCSI storage, including 18 GB[5] 10,000 rpm Wide-Ultra2 SCSI drives
- Optimization for Windows NT Workstation 4.0
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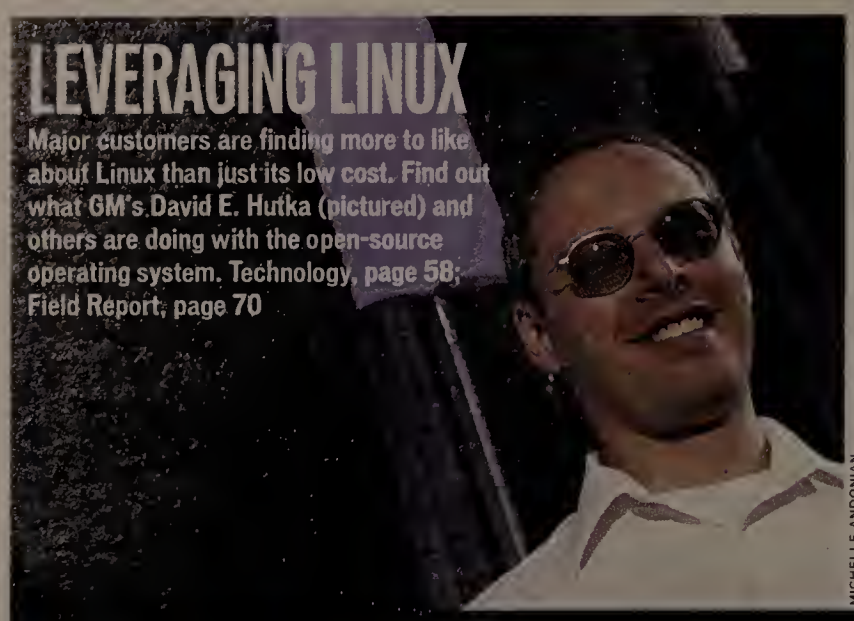


LEVERAGING LINUX

Major customers are finding more to like about Linux than just its low cost. Find out what GM's David E. Hutka (pictured) and others are doing with the open-source operating system. Technology, page 58; Field Report, page 70

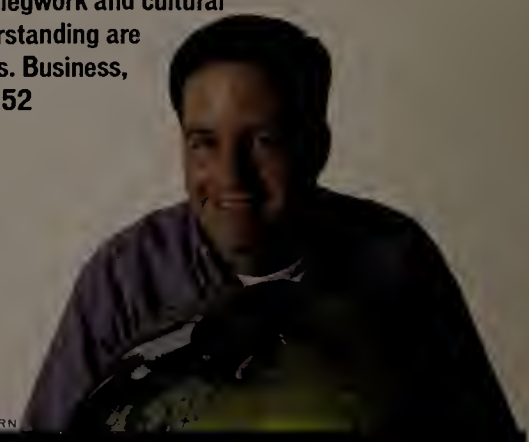
MICHELLE ANDONIAN

ROBERT B. REICH

Companies should be reaching out to new kinds of workers, not asking for more H-1B visas. Opinion, page 32

WHEN 'E' IS FOR EUROPE

C'est vrai! To do e-business on the Continent, Travelocity's Ned Booth and others have found legal legwork and cultural understanding are musts. Business, page 52



REID HORN

COMPUTERWORLD THIS WEEK

SEPTEMBER 6, 1999

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8 THE HOTMAIL SECURITY scare shows free Web mail services can be risky, but many users love them.

4 IBM WARNS of possible scalability, security and management problems with Windows 2000. Microsoft and analysts downplay the fears.

14 CUSTOMERS CAN GET a single global price on hardware and software through a new Web-based buying consortium from Control Data Systems.

16 RECRUITERS are looking beyond job fairs, want ads and on-campus visits to recruit technology staff.

30 SAP BUYS a minority stake in warehouse management software vendor Catalyst International.

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34 HAS YOUR VENDOR gone buyout crazy? Yes, no and maybe, Bill Laberis writes.

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38 PEOPLE RACE to test some Canadian encryption software in the face of a proposed security act.

39 AN INTERNET purchasing standard is released in a production version; backers hope OBI will now take off.

39 BANKS AREN'T JUMPING to offer account statements electronically, though some should do so by mid-2000.

40 IT ARMS-RACE mentality is causing the computer paradox, columnist Paul Strassmann writes.

42 *COMPUTERWORLD*'S 13th Annual Salary Survey

52 UGLY E-AMERICAN? U.S.-centric Web sites won't cut it in Europe. To do e-commerce on the Continent, legal legwork, cultural understanding and native languages are necessities.

54 BUSINESS QUICKSTUDY: Mass customization is the future, and IT is the key.

55 WORKSTYLES: What's it like to work at Internet start-up Kozmo.com?

55 PATIENCE, PATIENCE, career adviser Fran Quittel tells a programmer whose stock has tanked.

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SOFTWARE

58 GM PONDERS LINUX. That's right, the titan of the Industrial Age is considering rebel Linux to run apps at 7,500 car dealerships.

58 SAP SHOWS OFF R/3'S new interface, aimed at reducing complexity for end users.

HARDWARE

60 ADD-IN SERVER boards that speed data encryption can now secure the keys that perform that encryption.

OPINION

61 TO KEEP UP YOUR WEB site, what you buy isn't as important as how you manage it, writes technology editor Robert L. Scheier.

62 EMERGING COMPANIES: DataSage is a personalization software company — and then some.

66 EXEC TECH: We check out four low-priced scanners.

68 QUICKSTUDY: We define and explain Internet Protocol Security.

70 FIELD REPORT: The attraction of Linux goes beyond its low cost, but nagging concerns about support just won't go away.

74 THE W3C'S work is almost universally admired — but its structure gets mixed reviews.

76 FLASHBACK: 1984 saw the arrival of the Mac and the breakup of AT&T.

"ANY CIO WHO HAS TIME TO FUTZ AROUND BUYING BOXES IS NOT REALLY PARTICIPATING IN THE BUSINESS. THEY'RE BEING A TECHIE."

DORON COHEN, ANALYST, GARTNER GROUP, EXPLAINING WHY HE'S SKEPTICAL ABOUT A WEB-BASED BUYING SERVICE THAT OFFERS GLOBAL PRODUCT PRICING TO IT MANAGERS. SEE PAGE 14.

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AT DEADLINE

'Thursday' Virus Spreads at Banks

A new Word 97 macro virus programmed to delete hard drive files on Dec. 13 has hit 5,000 desktops at banks and financial institutions in the U.S. and Europe. Santa Clara, Calif.-based Network Associates Inc. said its Anti-Virus Emergency Response Team received reports of the W97M/Thus.A, also known as "Thursday." The virus spreads through sharing documents; antivirus software can detect it.

Win 2K Beta Delay

Release Candidate 2 of Windows 2000 won't be released today as Microsoft Corp. had pledged, a Microsoft spokeswoman said last week. "They're still targeting September" for the fifth prerelease version of the operating system, the spokeswoman said. Two weeks ago, Microsoft CEO Bill Gates said he was "pretty sure" the operating system would ship as planned by year's end [News, Aug. 30].

IT Research Urged

The Computing Research Association and Technology Network has warned that U.S. spending on information technology research is lagging and said Congress should change its budget plans. President Clinton has sought a $286 million increase in research spending for the National Science Foundation, the Defense Advanced Research Project Agency and the U.S. Department of Energy. Congressional leaders have cut that figure to $80 million.

The government spends about $1.4 billion per year on IT research.

Political Invasion

The Center for Democracy & Technology said the Web sites of 11 presidential hopefuls are gathering detailed information from contributors and volunteers, but some haven't posted privacy policies.

The center ranked hopefuls Bill Bradley, Steve Forbes, Al Gore, Orrin Hatch and John McCain as being open with their policies. Gary Bauer, Pat Buchanan, George W. Bush, Elizabeth Dole and Dan Quayle trailed.

IBM Raises Win 2K Beta Interoperability Concerns

Microsoft pledges problems will be fixed

BY DAVID ORENSTEIN
RALEIGH, N.C.

EVEN as it touted the advance of Windows 2000 into the enterprise as virtually certain, IBM last week questioned certain fundamental aspects of the beta operating system's interoperability and scalability.

Analysts, though, called the concerns minor, and Microsoft Corp. insisted the problems will be solved.

In a two-day seminar for reporters last week, IBM praised Windows 2000 as a much-improved operating system and predicted that it will gain a foothold beyond its traditional file- and print-serving role in certain enterprise situations. IBM highlighted several of its new hardware, software and service offerings intended to capitalize on the huge market expected for Windows 2000.

But Patrick Gibney, IBM's director of Windows 2000 systems, sought to warn reporters about problems that Windows 2000 might cause for users as it moves deeper into enterprises, where other technologies have ruled. He said the operating system's multiprocessor scalability might be foiled if multiple applications are on the same server, that Active Directory and Kerberos security features don't fully interoperate with non-Microsoft counterparts and that Microsoft's management console isn't Web-based (see chart).

Incompatibility between older implementations of Kerberos security and the one in Windows 2000 is a problem for Al Williams, director of distributed computing services at Pennsylvania State University in State College, which at peak times provides computer lab services to 1,500 students concurrently. The university now manages its Kerberos security certificates on a separate server, which Windows 2000 can't reach because of the difference in how the systems operate.

But analysts said users aren't likely to be bothered much by the problems that IBM pointed out. Neil MacDonald, an analyst at Gartner Group Inc. in Stamford, Conn., said third-party tools can synchronize Active Directory and other directories and bring a Web-based interface to manage Windows 2000. Few Windows NT users have older installations of Kerberos security, he added.

And analyst Dave Marshall at International Data Corp. in Toronto said hardware is now so cheap that few users will mind having to dedicate a server to one crucial application. ◗

Closed Windows?

Concerns from IBM and responses from Microsoft on the issue of Windows 2000 interoperability and scalability:

IBM'S CONCERNS

1. Poor workload partitioning on Windows 2000 servers with multiple processors would ruin high performance if users run multiple multiprocessor applications on the same server
2. Microsoft uses the newest Kerberos secure network authentication and authorization standard, which isn't backward-compatible with the more commonly implemented Distributed Computing Environment Kerberos security
3. Microsoft hasn't provided full synchronization between Active Directory and other lightweight directory access protocol (LDAP) directories
4. Because Windows 2000's management console has a Windows-specific interface rather than Web-based interface, administrators won't be able to manage parts of their network from non-Windows stations

MICROSOFT'S RESPONSE

1. Windows 2000 includes a new API to better control processor usage, memory allocation and locking, and application access to additional memory
2. If customers demand interoperability, the company will engage partners such as IBM to provide the testing
3. The Dirsynch API will let developers expose changes in one directory to another. The purchase of Zoomit Corp. earlier this year will provide the engine to synchronize changes among LDAP directories
4. Management console does have Web capabilities, but interface elements such as drag-and-drop and highly scalable trees are only feasible under a native Windows interface

SOURCES: IBM AND MICROSOFT

Microsoft Plans to Host Office Apps Online

But analysts don't expect much use

BY DAVID ORENSTEIN

Corporate interest in Web-hosted Microsoft Office applications, which were announced last week, will likely be limited, several observers said.

Microsoft Corp. President Steve Ballmer announced the plans to reporters in a conference call, confirming the widely rumored appointment of former Silicon Graphics Inc. CEO Rick Belluzzo as vice president of Microsoft's consumer and commerce group. Ballmer didn't provide a time frame or other details about the plans.

Microsoft's announcement that it will host its Office suite of applications on the Web follows Sun Microsystems Inc.'s announcement that it will provide office applications from Star Division, which it plans to acquire (see story, page 30).

But Amy Wohl, an analyst at Wohl Associates in Narbeth, Pa., said Microsoft has been pondering making Office available on the Web for months. It isn't simply trying to confuse the market with its announcement, she said.

Wohl said she has spoken over the past several months with application service providers, which she didn't name, that claimed to have negotiated with Microsoft to host Office applications online. Microsoft, meanwhile, has let hints about application hosting trickle out over time. The company had never been so explicit about the possibility that it would host Office applications itself, Wolh said.

Still, many users are likely to stick with Office on the desktop. One such skeptic is John Weigel, technical architect at Andersen Corp., a window and door maker in Bayport, Minn. "When the network goes down, how many people do you have sitting around doing nothing?" he said.

With applications running over the Internet, the company would be unable to pinpoint network slowdowns, as it can with its local networks. Also, Weigel said, Andersen has too much sensitive data and content in its Office documents to expose them to remote sites and a public network.

Among the corporate users most likely to demand Office over the Web are ones that are upgrading hardware and may not want to manage the software in-house anymore, Wohl said. But there will always be a large segment of users who want to keep Office on their PCs, she said. ◗

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PeopleSoft Acts on Dip In User Satisfaction

Will add tech support; some upgrades cut

BY CRAIG STEDMAN
NEW ORLEANS

AT ITS annual user conference here last week, PeopleSoft Inc. announced changes in product development and technical support aimed at stopping a six-month slide in customer satisfaction ratings.

The moves include cutting the number of minor upgrades that users of PeopleSoft's enterprise resource planning applications must make and expanding tests on new releases to catch more software bugs (see chart).

PeopleSoft executives, as expected, also said they're partially undoing an earlier reorganization that eliminated 500 support engineers who were assigned to work directly with individual users [News, Aug. 30].

John Martines, president of PeopleSoft's international customer advisory board, said members of the panel "heard loud and clear" from users in recent months that they wanted PeopleSoft to improve its software quality and make it easier to work with the applications.

Martines, vice president of the financial systems group at Reliance Insurance Group in Philadelphia, is a case in point. He said his rollout of PeopleSoft's financial applications has been slowed by quality issues and the need to keep upgrading the applications it already has in place. But he said PeopleSoft appears to be committed to fixing the problems.

Craig Conway, PeopleSoft's president, said the customer satisfaction numbers on quarterly surveys done for the Pleasanton, Calif., vendor remain relatively high. On the most recent one, 84% of the users surveyed said they remain "strongly committed" to PeopleSoft's software.

But that was down from 90% earlier in the year — enough to get PeopleSoft's attention. "We found an undertone of unhappiness," Conway said.

Peg Nicholson, CIO at Acushnet Co. in Fairhaven, Mass., said there was "a little slippage in the quality of the software that we're looking forward to having corrected." Acushnet, a maker of golf equipment, began running PeopleSoft's applications at some operations earlier this year and is now adding more facilities to the system.

Another sore spot for users was the rapid upgrade schedule PeopleSoft launched last year, when it began bundling bug fixes into minor releases that came out every three months. The catch was that support for each release ended as soon as the next one was ready. "Everyone told them it was a terrible idea," said David Dobrin, an analyst at Benchmarking Partners Inc. in Cambridge, Mass. "You kill people when you spit out all these minor releases."

That will stop, Conway said. PeopleSoft will now only issue minor releases every six to 12 months, and the company will support the previous two releases after a new one becomes available. ◗

Self-Improvement

To boost customer satisfaction, PeopleSoft is:

- **TESTING** software more, covering more systems and combinations of different applications
- **LAUNCHING** a beta-testing program, starting with the upcoming PeopleSoft 8 upgrade next year
- **SUPPORTING** minor releases for more than 90 days
- **ADDING** 85 "support account executives" to help make sure users get problems fixed
- **DEVELOPING** new upgrade tools and better online documentation

Norton Ghost Changes Shape

Creates, restores disk image in minutes

BY SAMI LAIS

Symantec Corp. next week will transform Norton Ghost, a utility for cloning the contents of a PC's hard disk, into a Swiss Army Knife that handles software distribution and restoration chores.

Cupertino, Calif.-based Symantec last year bought the basic disk-cloning software from Binary Research in New Zealand. Version 6.0 adds features that venture into other desktop management areas.

Multicasting capabilities morph it into a software distribution tool. With features such as Ghost Console and Console Client, Ghost 6.0 gains remote management and postcloning configuration abilities.

It even edges into backup and disaster recovery. "The big advantage of Ghost is you can copy programs and data in minutes, whereas a tape backup would take much longer," said beta-tester Paul Riemerman, co-owner of Flying Frog Consulting, custom database designers in Philadelphia.

But Ghost 6.0 is still a tool, not a full-featured desktop-management suite. "The problem is that you're returning the PC to the state it was in when it was first installed," said Philip Mendoza, an analyst at International Data Corp. in Framingham, Mass.

More advanced software distribution packages would probably be a better bet, Mendoza said.

Ghost 6.0 is unwieldy for mass backups, but administrators can use it to make weekly snapshots of PCs. "It's about five mouse clicks," Riemerman said, touting the software's ease of use.

If the CEO's laptop crashes on the road, the administrator can use Ghost 6.0 to restore it in minutes over the Web. "We could use that in a big, bad way," said Karole Johns, director of desktop services at Thomson Financial Services in Rockville, Md.

Ghost 6.0 also features "the DOD wipe," so-called because it makes files unrecoverable and meets U.S. Department of Defense standards. The price of the enterprise version of Ghost 6.0 would be about $32,000 for 2,000 seats.

One analyst said the need for Ghost may fade away. With tools such as Data Focus Inc.'s Terminal Saver and Microsoft Corp.'s IntelliMirror and Systems Management Server 2.0 coming out, "I'm having trouble seeing why an IT manager will need any of these tools in a few years." said Rob Enderle, an analyst at Giga Information Group Inc. in Santa Clara, Calif. ◗

JUST THE FACTS

Software Distribution

- **High-end tools:** Computer Associates' Unicenter TNG Software Distribution option; Hewlett-Packard's OpenView Software Distributor; Novadigm's Enterprise Desktop Manager
- **Midtier tools:** Intel's LANDesk Management Suite; Microsoft's Systems Management Server; Novell's NetWare Application Launcher
- **Imaging tools:** KeyLabs' RapiDeploy; Lanovation's PictureTaker; Micro House International's ImageCast; Miramer Systems' DesktopDNA; Symantec's Norton Ghost

PeopleSoft to Shift Focus to External Supply-Chain Apps

BY CRAIG STEDMAN
NEW ORLEANS

PeopleSoft Inc. is again changing the development and marketing strategy for its manufacturing and supply-chain management applications, which have been slow to catch on with users.

PeopleSoft executives last week said they now plan to focus product development more on external supply-chain logistics and distribution uses — especially for users doing business online — than on internal manufacturing capabilities.

Craig Conway, PeopleSoft's president, said basic manufacturing applications such as materials-management and production-planning won't be ignored or dead-ended. "But we're not investing $100 million to line up every capability against SAP," he added.

PeopleSoft didn't offer any manufacturing and supply-chain applications until 1996, putting it far behind rivals SAP AG and Oracle Corp. And it's still "outgunned significantly" on functionality by the other vendors, said John Bermudez, an analyst at AMR Research Inc. in Boston.

PeopleSoft acknowledged that it has done a bad job of marketing the applications, which have been bought by about 140 companies, half of which have gone live.

One of those users is Acushnet Co., a Fairhaven, Mass., maker of golf equipment that's running the manufacturing applications at two plants and working on rollouts at three more facilities.

PeopleSoft's functionality "was a little light compared with an SAP" when Acushnet picked the software last year, said CIO Peg Nicholson. But that wasn't a drawback for Acushnet, which was running the plants on spreadsheets and didn't want to overwhelm its workers with complexity.

Nicholson said she isn't worried about the change in emphasis at PeopleSoft. "They've done a good job developing the product to date," she said.

Thor Wallace, CIO at Cybex International Inc. in Medway, Mass., had a similar reaction. "I'm not worried about the commitment level" at PeopleSoft, said Wallace, whose firm uses the manufacturing and supply-chain applications at its fitness-equipment plants. ◗

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BRIEFS

Minor Win 2K Setback

Microsoft Corp. and Intel Corp. last week demonstrated a 64-bit version of Windows on a prototype system built around Intel's forthcoming Merced chip. However, the operating system suffered another minor setback when the company revealed that Release Candidate 2 of Windows 2000 won't be released today as Microsoft had pledged.

PeopleSoft Hosting

PeopleSoft Inc. said it will offer application hosting services early next year. The company has left hosting of its back-office software to established services firms. PeopleSoft said it expects to enter the business with its human resources software.

Intergraph Shifts Focus

Intergraph Corp. in Huntsville, Ala., will exit the PC and server business to focus instead on delivering customized software, hardware and services to nine vertical industry segments, the company said.

The changes will result in the loss of 400 jobs worldwide and a charge of some $20 million for the quarter ending Sept. 30, said Intergraph. The company has blamed Intel Corp. for "irreparably harming" its PC and server business by refusing to share information about its chip design or provide new products in a timely manner, but Intel denies that.

Intel the Investor

The world's largest chip maker has formed a $200 million equity fund to invest in companies supporting Intel's initiatives in voice and data communications. Initially, the Intel Communications Fund will invest in companies developing products based on Intel's new Internet Exchange Architecture.

Robotic Upgrades

Digital River Inc. in Minneapolis last week announced EBot, a free service for PC users to get the latest software releases, patches and bug fixes relevant to the subscriber's system. The electronic robot scans for appropriate update information from an EBot database. The utility is available at *www.ebot.com*.

Hotmail Security Breach Of Corporate Concern

Use of free e-mail, though banned at some workplaces, points to need for alternatives

BY DOMINIQUE DECKMYN AND ANN HARRISON

THOUGH MANY corporations have already outlawed the use of free Web-based e-mail to conduct company business, last week's Hotmail security scare alerted everyone else to the dangers of this technology. Nonetheless, some analysts said the technology may have some legitimate business uses.

The security hole, which was patched by Microsoft Corp. last Monday, allowed anyone access to another user's in-box, without knowing the password, by using a simple script (see story, at right).

Analysts were quick to point out that free Web e-mail services should never be expected to be safe. But the dirty little secret is that many corporate road warriors use Web mail like Hotmail or Yahoo Mail as a secondary e-mail account because it's easy to access from any location with only a browser.

"It's free; how can you expect it to be 100% secure?" said Ron Rude, technical systems supervisor at the *Peoria Journal Star*, a newspaper in Peoria, Ill., that has outlawed the use of Web-based e-mail services.

There's also a risk that some employees might be tempted to use Hotmail internally to bypass corporate e-mail policies. At Ragen MacKenzie Inc., a Seattle brokerage firm, surrendering to that temptation can get you fired, said Senior Vice President Jim McCollister.

To comply with Securities and Exchange Commission regulations, the company uses software to filter e-mail sent by its brokers — but the software can't read Web mail, so its use is forbidden.

So what's a company that wants to protect itself to do?

One software vendor that said its software can detect and filter Web mail messages is Worldtalk Corp. in Santa Clara, Calif., whose WorldSecure/Web software scans ingoing as well as outgoing HTTP traffic.

Another alternative: Give your employees another e-mail option. If employees are using free Web mail, they may legitimately need more flexible e-mail access, according to Joyce Graff, a vice president at Gartner Group Inc. in Stamford, Conn. Her advice: Companies should either install their own secure Web-based e-mail systems or turn to providers that can deliver security and service-level agreements. ◗

MOREONLINE

For resources, such as articles and papers, on e-mail security, visit our Web site.
www.computerworld.com/more

How the Exploit Succeeded

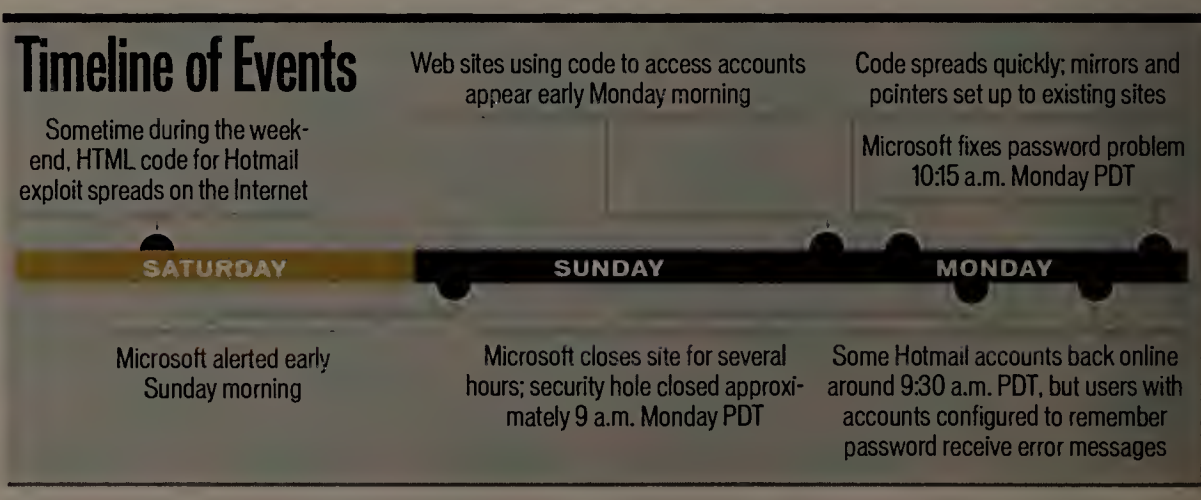
So, how did it happen?

According to Richard Smith, a security expert and president of Phar Lap Software in Cambridge, Mass., the hack that exposed the private accounts of millions of Hotmail users exploited a software bug in the service's log-in commands that defeats a password check.

An HTML-scripted form that exploited the hole was passed around the Internet and used to create Web sites that provided access to Hotmail accounts.

Interlopers could read and send mail from Hotmail accounts by simply typing in a user name without a password. Smith said all he had to do was enter a URL into a Web browser, which simulated a Hotmail form. – *Ann Harrison*

Timeline of Events



Novell to Start Licensing Software Online

But corporate users may resist concept

BY DAVID ORENSTEIN

Novell Inc. announced last week that it will begin licensing its software online, but an analyst cautioned that many corporate users remain cold to the concept.

Electronic volume licensing was designed to simplify software purchasing not only by eliminating disks and packaging, but also by making licensing information immediately available at the time of purchase.

News of Novell's Electronic Distributor Program follows similar e-commerce announcements by other major vendors, such as Microsoft Corp., Oracle Corp. and Symantec Corp.

"Vendors are definitely interested in this," said Steven McHale, an analyst at International Data Corp. in Toronto. But unless software companies can show corporate users a concrete benefit, they will continue to resist buying enterprise software online, he said.

Vendors can accomplish that goal either by offering users discounts that pass on some of the savings or by helping users integrate information on the downloaded software with their existing asset management tools. So far, that hasn't happened, he said. ◗

Corrections

An Aug. 23 article ["Trade.com Bets Big on Thin Server Strategy," page 58] should have said Charles Schwab & Co.'s online operation uses servers from both Sun Microsystems Inc. and IBM.

An Aug. 30 QuickStudy ["M Bytes, MHz and More," page 67] mistakenly referred to a "386-MHz" PC. The reference should have been to a "386 PC."

Compaq's NT Decision Fuels Alpha Fears

BY JAIKUMAR VIJAYAN

Compaq Computer Corp.'s decision to abandon Windows NT on Alpha [Page 1, Aug. 30] is fueling broader user concerns about the chip's future.

The move may make tactical and financial sense, users said, but it's worrisome given Compaq's earlier statements about long-term support of NT on Alpha. For example, only two days before pulling the plug on NT, Compaq insisted it would support 64-bit versions of NT on Alpha.

Compaq's about-face underscores its Intel-centric heritage, said Joseph Pollizzi, deputy head of engineering at the Space Telescope Science Institute in Baltimore.

JOE POLLIZZI says Compaq is focused on its Intel products

"They don't market the products. There are very few public statements from the company about Alpha. It only gets a fraction of the press that Compaq's Intel products do . . . so there is a natural fear," said Pollizzi, who is taking delivery of new Alpha servers this fall.

Marion Dancy, a Compaq vice president, said the company is aware of concerns but remains committed to Alpha.

Compaq acquired Alpha technology with its purchase of Digital Equipment Corp. in 1998. Systems based on the chip power a variety of high-end 64-bit OpenVMS and Tru64 Unix applications.

Only 2% of the 500,000 installed Alpha systems run Windows NT.

User angst is acute among OpenVMS customers who have remained unconvinced that Compaq will keep its Alpha promises.

OpenVMS is now supported only on Alpha hardware, and dwindling demand for the operating system could lead to the abandonment of the platform, users said.

"Compaq's emphasis on Unix rather than VMS is a major concern for us," said Fernando Yson, systems manager at Unicare Cost Care Inc., a user of Alpha servers, in Huntington Beach, Calif. The company is migrating the last of its VMS applications from older VAX systems to Alpha. "But we might start looking at other operating systems" next year, given Compaq's Unix emphasis, Yson said.

"The litmus test for the commitment to Alpha is to watch to see if Compaq proceeds fully with its plans to deploy Himalaya technology on Alpha," said Jeff Killeen, a board member of the Digital Equipment Computer User Society.

Since it acquired Digital, Compaq has refreshed its Alpha server lineup, introduced a new Unix version, announced new clustering technology on OpenVMS and announced it will migrate Tandem's servers to Alpha, Dancy said.

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U.S. Defense Audit Reveals Serious IT Security Problems

BY PATRICK THIBODEAU
WASHINGTON

Information systems at the U.S. Department of Defense suffer from "serious weaknesses" and are vulnerable to hacker attacks and fraud, warned the General Accounting Office last week after conducting an audit of the department's massive array of unclassified systems.

Many of the problems cited by the GAO have to do with basic security measures: Passwords weren't changed often, audit logs weren't consistently reviewed, and user access was poorly documented, among other things.

But the same thing could be said about private-sector systems, several corporate security managers and experts said. The problems that the GAO cited "are widespread throughout every single organization," said Chris Grillo, an information technology security manager at Minnesota Power Inc. in Duluth and an auditor at Canaudit Inc., a Simi Valley, Calif., firm.

"I challenge IS security practitioners to take the GAO findings and ask themselves the same questions about their organizations," said Richard Power, editorial director at the San Francisco-based Computer Security Institute.

But Bob McKee, assistant vice president of corporate information security at The Hartford Financial Services Group Inc. in Hartford, Conn., said the GAO's report surprised him. McKee said he thought an organization as large as the Defense Department, and one with "a fair amount of sensitive information to protect, would hit those things head on."

In response, the Defense Department said it was addressing the problems raised by the GAO. The GAO's review focused on the department's unclassified systems, which make up a substantial part of its 2.1 million computers and 10,000 LANs.

The report was a follow-up to a security audit in 1996 that found similar problems. ◗

Security Breach

The GAO's concerns about the Defense Department included:

- Users had system access in excess of job responsibilities.
- Inadequate periodic review of access privileges.
- Audit logs weren't consistently reviewed.
- Duties weren't adequately segregated. Programmers had system administrator rights, allowing for the possibility of unauthorized changes and no audit trail.
- Data wasn't backed up regularly.

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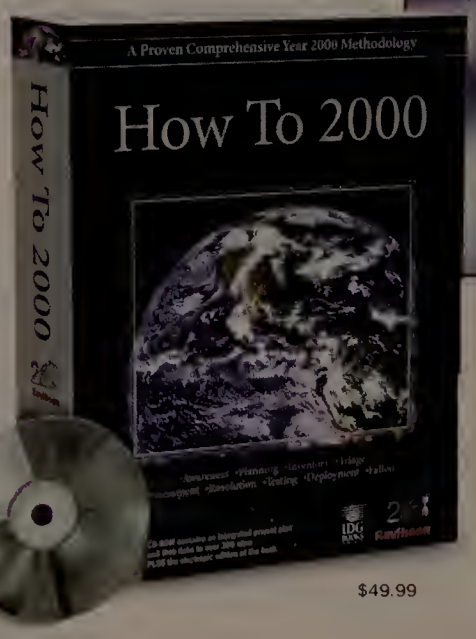

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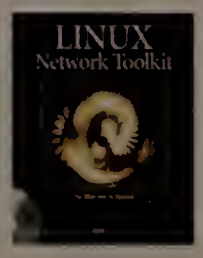

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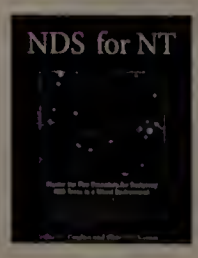

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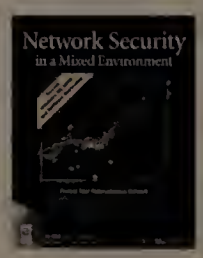

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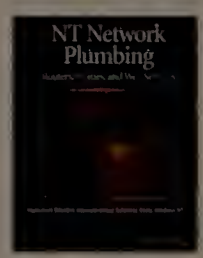

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ERICSSON

Intel to Apply 'PC Economics' to Servers

CEO plans to ramp up production

BY MARK HALL
PALM SPRINGS, CALIF.

INTEL CORP. last week said it intends to meet a huge surge in demand for Web servers over the coming years by employing a commodity strategy — ramping up volume production that will lead to price cuts for users.

But users and analysts don't agree that pricing is the top issue, at least for high-end systems. At eToys Inc., a Santa Monica, Calif.-based online retailer, server prices are "an issue to a degree," said Kayne Grau, director of technical services. "But it's not that big a deal today. "What's important for us is to give the best shopping experience users can have online, which means speed and reliability are critical."

INTEL CEO Craig Barrett sees a huge need for servers

Intel CEO Craig Barrett last week told attendees at the Intel Developers Conference here that company research indicates that of the Internet servers likely to be needed by 2005, less than 4% are currently installed. He said only a new "PC economics" for servers will fill that void, including volume manufacturing and increased use of standard components.

According to Netcraft.com, a Web site in England that electronically counts sites on the Internet, there are more than 7 million sites on the Web. Using Intel's calculations, that would mean that by 2005, approximately 175 million sites would respond to Netcraft.com's monthly electronic tabulation.

Steve Fry, director of system marketing at server maker Sequent Computer Systems Inc., agreed that Intel's volume manufacturing program would work on "a four-way NT file server but not a back-end Unix database server. We do things differently in [that kind of] hardware than on a typical Intel white box."

Jonathan Eunice, an analyst at Illuminata Inc. in Nashua, N.H., said high-end servers aren't likely to join the price-cutting fray. He said powerful four- and eight-processor systems will lead the price slide.

Though he agreed that Intel will succeed in driving down server prices to spur growth, Mike Prince, CIO at Burlington Coat Factory Warehouse Inc. in Burlington, N.J., said the complexity of managing many small servers will favor high-end systems, especially in data center environments.

IBM, with its own microprocessor technology, is likely to be the server vendor best able to rise to Barrett's challenge, according to one analyst. "Nobody is ahead of IBM in listening to the data center customer," said Richard Doherty, director of The Envisioneering Group in Stafford, N.Y.

IBM Joins Thin-Client Party

Devices give access to Web, NT apps

BY STACY COLLETT

Keeping with the theme set by other thin-client manufacturers, IBM this week will unveil a new family of Web-enabled thin clients.

Series 2200 lets end users run Web browsers and Windows NT inside the device. The other family member, Series 2800, was designed for multimedia applications, interactive Internet sites and kiosk environments. Pricing for IBM's devices will begin at less than $999. Competitive models from Hewlett-Packard Co. cost $599 and up.

The products come with Network Station Manager, Version 2.0, Release 1. It has a Windows graphical user interface and includes Netscape Communicator Version 4.5 and Citrix Systems Inc. software enhancements such as audio playback capabilities, remote application manager and Secure Independent Computing Architecture.

IBM won't offer Linux as a platform for its new product, unlike thin clients announced recently by HP and Sun Microsystems Inc. Instead, it will offer information on how to run Linux software on the client.

Observers said the new products round out IBM's offerings.

"They're saying that thin clients aren't necessarily for everyone, and whatever you need, they can provide. They can give you a handheld, a desktop, a portable and a thin client," said Eileen O'Brien, an analyst at International Data Corp. (IDC) in Framingham, Mass.

IBM had 22.1% of the worldwide thin-client market last year, second to Wyse Technology Inc., which had 31.8%, according to IDC.

Separately, IBM last week announced an agreement with thin-server manufacturer Network Engines Inc. to license its hardware and firmware technology for IBM's Netfinity server line. Terms of the agreement weren't disclosed.

Network Engines servers are 1.75 in. high, enabling up to 40 servers to fit in a standard equipment rack. The servers work in large clusters which are scaled to run specific applications in Web-hosting environments. The Randolph, Mass.-based company has two types of thin servers: WebEngine, based on Windows NT; and XEngine, which supports Linux.

IBM "is interested in the fact that we can support Linux," said Lawrence Genovesi, president and CEO of Network Engines. Genovesi added that IBM will announce new products with Network Engines' technology this month.

Frenzy Once Again

Thin clients are all the rage – again.

In addition to IBM's announcement, Sun will announce Wednesday a new "network appliance" that runs multiple platforms – not just Java like its ill-fated JavaStations. And HP last week rolled out three new Web-enabled devices that run on Linux and other platforms.

Why all the new products? Some observers said users are finally accepting thin-client technology. IDC reports that in the first six months of 1999, thin-client sales equaled sales for all of 1998 – about $287 million.

What's different about the technology today?

The turnaround started last summer, when Microsoft Corp. gave thin-client technology its blessing in the form of Terminal Server Edition software, which lets users centrally access and monitor Windows applications.

More recently, the suitability of application service providers for thin clients have fueled new demand.

– *Stacy Collett*

MOREONLINE

For coverage of thin-client computing and links to related pages, visit our Web site.
www.computerworld.com/more

I/O Rivals Declare Truce, Plan New Architecture

BY STACY COLLETT

A group of computer industry heavyweights reached a truce last week in an I/O technology battle that threatened to stall products and wreak havoc for end users and vendors.

At issue was the way equipment like disk systems and network cards plug in to servers. The companies, including Intel Corp., IBM, Sun Microsystems Inc., Dell Computer Corp., Hewlett-Packard Co. and Microsoft Corp., have agreed to develop a new architecture called system I/O.

Exact I/O specifications will be available by the end of December, and new products based on the architecture will be shipped in 2001.

The new specification combines features developed by the Next Generation Input/Output (NGIO) group, championed by Intel and favored by Sun and Dell, and the Future I/O group begun by HP, IBM and Compaq Computer Corp. Conflict has raged for nearly two years over which standard should dominate.

"Future I/O people gave up the idea that they all will be equal partners," said Jonathan Eunice, an analyst at Illuminata Inc. in Nashua, N.H. "Intel will have more say than Compaq or HP. And Intel gave up the idea of [dominating] the standard-setting process."

The new specification will be channel-based, so that information can flow back and forth in its own separate channel more quickly than with bus architecture. Channels are also more scalable than buses and less expensive.

System I/O will provide enhanced performance over bus architecture for entry-level servers through high-end data call centers, with data being transferred about 10 times faster than current bus architecture, observers said.

JUST THE FACTS

All About The I/Os

What's NGIO? A high-speed serial bus, in which data is sent 1 bit at a time.

What's Future I/O? An extension of PCI-X, a faster version of the PCI bus currently in PCs. PCI is a parallel technology that sends data at 64 bits at a time across a bundle of 64 wires. Future I/O would use a similar parallel approach for connections less than 10 meters but use a serial approach similar to NGIO's for longer connections.

What's System I/O? A channel-based, switch fabric design combining features from the two technologies. It features interoperable links with bandwidth from 500M to 6G byte/sec.

Competitive advantage: Windows NT on Compaq

Inside information: *Windows NT Advantage*

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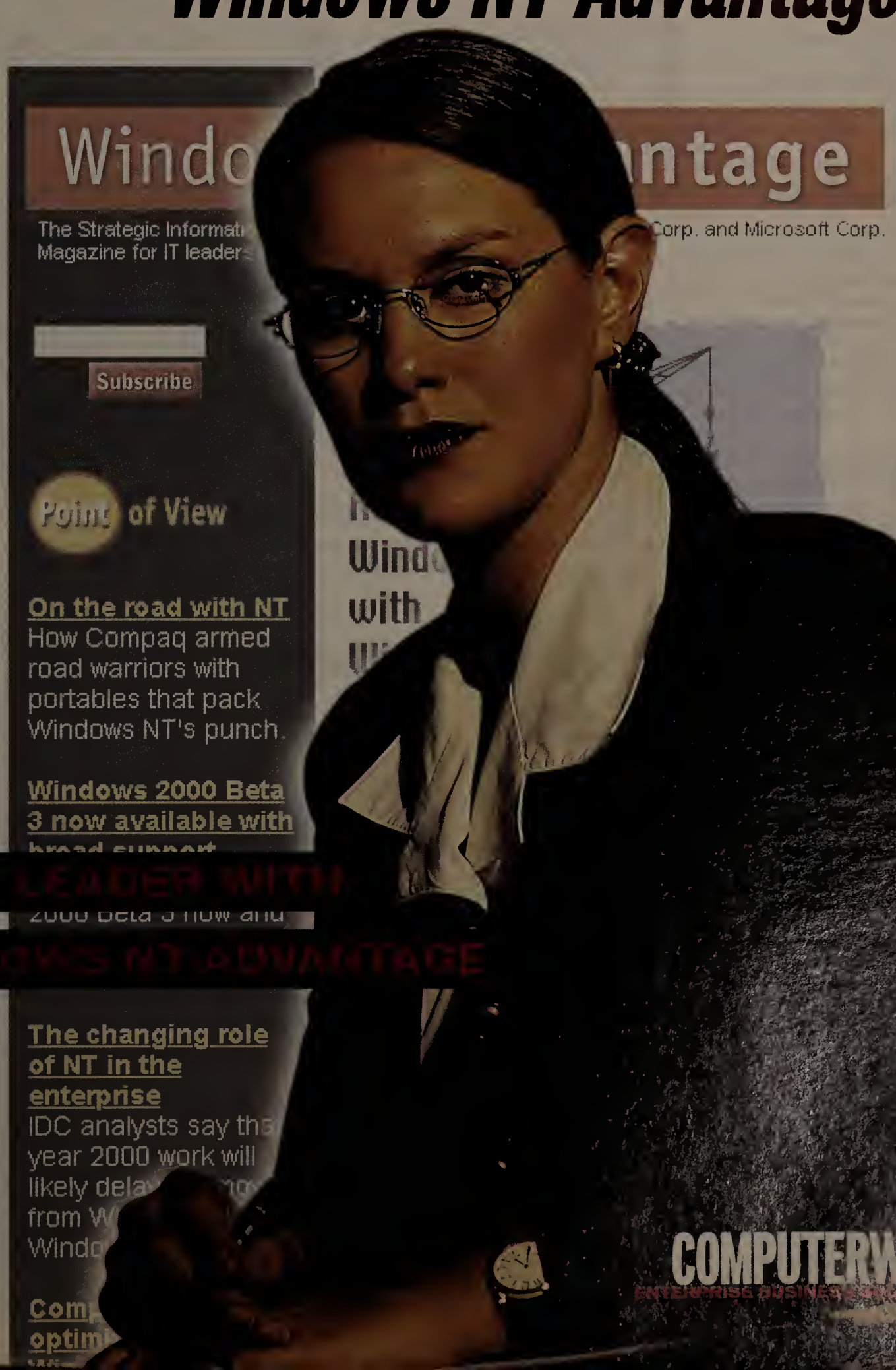


BRIEFS

SAIC Nabs Deal To Handle Entergy's IT

Science Applications International Corp. (SAIC) in Arlington, Va., has signed a five-year, $400 million contract to deliver information technology services to Entergy Corp. in New Orleans. SAIC will start handling new application development, software maintenance and data center operations next month. Entergy's IT workers can remain Entergy employees or join SAIC.

Web Finance Soaring

By 2003, Jupiter Communications Inc. in New York said, it expects the online financial services market to top $3 trillion, with more than 20 million households doing business online. That's compared with 4.3 million households in 1998 that had Web-based accounts and transacted $415 billion in financial services.

Merrill Lynch Picks Giganet cLAN Tools

New York-based Merrill Lynch & Co. has chosen Concord, Mass.-based Giganet Inc.'s cLAN products for its server clusters running its Internet-based Broker Information Management System. Merrill hopes to give its consultants rapid access to the application's portfolio analysis and management capabilities.

China Auction Site

With its launch in Beijing last week, ClubCiti.com became China's first online auction site. Until now, online shoppers in China could visit e-commerce sites but had to pay by mail or in person, according to ClubCiti's founders in Santa Clara, Calif. The site will handle payments and deliveries via partnerships with the state-run Postal Administration Bureau and China's largest auction house, China Guardian.

Amazon IT Director

Amazon.com Inc. hired former Microsoft Corp. executive Ben Slivka as director of IT. Once general manager at Microsoft's consumer and commerce group, Slivka will start next week, reporting to the CIO.

Buyers' Club Brokers Hardware on the Web

Service may cut IT procurement costs

BY JULIA KING

THINK of it as an electronic Sam's Club for information technology managers. That's one way to describe a new Web-based global buying consortium announced last week by Control Data Systems Inc. (CDS) in Arden Hills, Minn.

CDS is offering an outsourced procurement service and the software users need to buy hardware online from designated suppliers that guarantee a single global price on their products.

On the plus side, the service can cut worldwide IT procurement costs and increase adherence to corporate standards at far-flung regional offices. The downside is less flexibility.

Companies with IT budgets exceeding $80 million per year can join the club for an initial fee of $100,000 to $200,000. That covers implementation of Web-based software linking worldwide corporate buyers and designated equipment suppliers.

CDS also integrates the procurement software to member companies' internal enterprise financial and inventory systems.

2% Transaction Fee

After that, members pay a transaction fee of 2% on all printers, PCs, servers and other hardware, with each piece carrying the same discounted price whether it's purchased in Syracuse or Singapore.

"A lot of companies say they have centralized pricing now, but what they actually have is a discount schedule against an IT vendor's local price," said CDS Vice President Sandie Rowe. "What we're talking about is a single price per product in U.S. dollars anywhere in the world."

Technology standardization is another benefit, said Peter Slator, head of IT at $50 billion Unilever PLC, the European consumer products giant that originally developed the buying process, which CDS is now offering as an outsourced e-commerce service. During the past two years, Unilever has cut some IT hardware costs by as much as 40% by buying gear from designated suppliers, Slator said. It also decreased support costs because it's now supporting standard desktops. This process stops "maverick buying," according to Slator. If someone wants something different, he must secure approval from a corporate executive.

DORON COHEN: "Companies don't buy just boxes anymore"

But the service's downside, according to analysts, is that what buyers get are individual products rather than a combination of products and services, which is what most large companies want to acquire. "Companies don't buy just boxes anymore. They buy solutions," said Doron Cohen, a former CIO at TransCanada PipeLines Ltd. in Calgary, Alberta, who is now an analyst at Gartner Group Inc. in Stamford, Conn. "Any CIO who has time to futz around buying boxes is not really participating in the business. They're being a techie," Cohen said.

Still, the single-price scheme appeals to Andy Hafer, IT director at Hydro Agri North America Inc., in Tampa, Fla. "The challenge now is that IT pricing structures are so different in different regions of the world," even under global buying agreements with vendors, Hafer said.

For example, under a global buying agreement with Hewlett-Packard Co., "we had a huge discount off of list price [in Norway], but that was still higher than the price from a value-added reseller in the U.S.," Hafer said.

Continued from page 1

Handhelds Tied to Mainframes

lets Palm Computing and Windows CE handhelds connect through a browser to a variety of mainframes. That connection happens via an AvantGo server and the new PalmFrame system, a service provided by AvantGo partner Attachmate Corp. in Bellevue, Wash.

In addition, the latest AvantGo version now runs on Linux and Sun Microsystems Inc.'s Solaris Unix operating system, as well as on Windows NT. The release also adds remote central management functions.

McKessonHBOC in San Francisco last week said it will deploy Version 3 on 2,700 handheld computers used by its pharmaceutical delivery drivers nationwide. The project, rolling out over the next 15 months, will cost several million dollars, the company said.

Several drivers are beta-testing the AvantGo product, using Symbol Technologies Inc. 1700 devices, which are ruggedized PalmPilots from Palm Computing, a division of 3Com Corp. in Santa Clara, Calif. The device is equipped with an integrated bar code reader.

Working with Whittman-Hart Inc. in San Francisco, McKessonHBOC will replace its paper-based delivery system and enjoy "substantial cost savings," said Jesse Bork, a project leader at McKessonHBOC.

GARY AUERMAN

JESSE BORK: An AvantGo delivery system deployed on 2,700 handhelds should yield "substantial cost savings" for McKessonHBOC

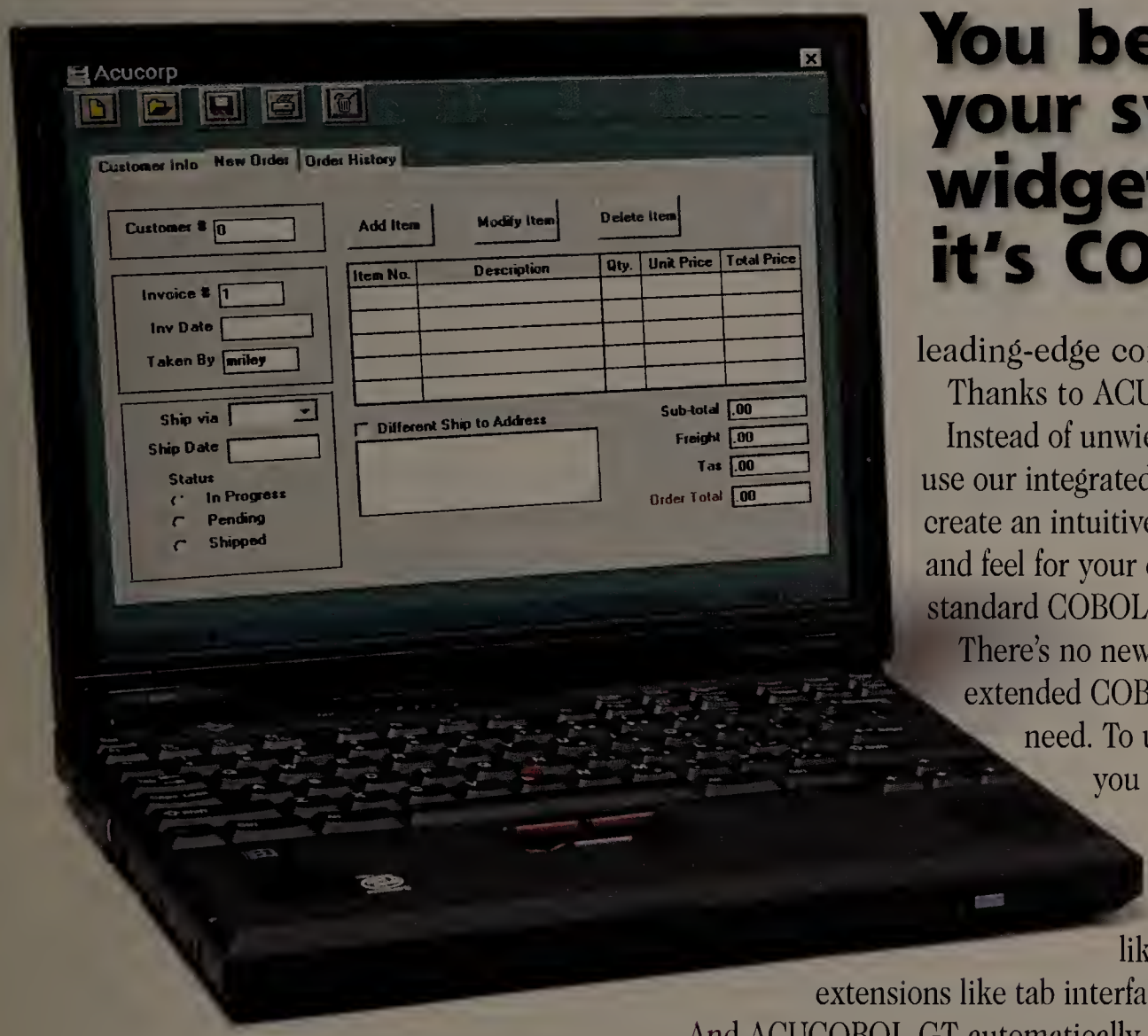
Drivers will synchronize their handhelds with an AvantGo server in 36 distribution centers each day, receiving truck route information. When a crate of medical supplies is delivered, the driver will scan the bar code on the crate, capture an electronic signature on the handheld screen and resynchronize at the end of the day to quickly update corporate records.

With the paper system, "If a customer says they didn't get something, the paper might be nowhere to be found since it could be misfiled or never brought back," Bork said. "The process might take weeks."

Attachmate plans to announce next week its mainframe-to-handheld connection service, which will cost an estimated $75,000 for setup and $200 per client.

Analysts said that cost might sound high, but the service could pay for itself, given the complex, months-long process of connecting handhelds to data with an in-house development staff.

This is COBOL?



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Finding Hot Recruits Is a New Game for IT

Companies get creative to engage talent

BY STEWART DECK

When the eight members of the University of Chicago chess team rolled into Reno, Nev., for the U.S. Chess Open this summer, they did so in the ThoughtMobile, a 34-foot Winnebago.

The camper is owned by ThoughtWorks LLC, a Chicago-based consultancy with 200 employees that hopes to hire at least three of these eight promising young minds for information technology jobs when they graduate.

The firm is part of an emerging class of recruiters that have started looking beyond job fairs, want ads and on-campus visits for ways to find talent in the cutthroat world of technology recruiting.

"We tried to figure out where smart students are and find people who hadn't necessarily been looking for high-tech careers," said John Hundrieser, director of recruiting at ThoughtWorks. "We knew we'd find some creative problem-solvers by sponsoring the team, and it would give us a recruiting advantage if they knew something about us."

Students Challenged

Inacom Corp., an Omaha-based systems integrator with 11,000 employees, uses another approach to discover IT-savvy students. It hands out invitations at career fairs and similar venues to get students to visit its Techno Challenge Web site (*www.inacom.com*).

UNIVERSITY OF CHICAGO chess team members played in the U.S. Chess Open, courtesy of ThoughtWorks LLC, a Chicago-based consultancy

Players compete for $1,500 prizes, and the top scorers are sent a video recruitment pitch via e-mail. "This has been a very effective tool for us with the one-to-one marketing we use," said Eva Fujan, vice president of technical recruiting at Inacom.

IBM is spending approximately $300,000 this year on a summer internship program called Extreme Blue, which the company hopes will entice 24 of the top computer science students at U.S. colleges to join IBM after they graduate.

The students went to its Lotus Development Corp. headquarters to work on a variety of cutting-edge projects, from JavaBeans to IBM's Griffin messaging project. Travel and housing expenses were all covered, said Jane Harper, a director of Internet technology at IBM. ◗

States Seek to Grow Own IT Workforces

Scholarships, tax credits on the increase, while efforts to raise H-1B cap persist

BY PATRICK THIBODEAU
FAIRFAX, VA.

Virginia estimates it has as many as 30,000 unfilled high-tech jobs. The problem is so urgent that last week the governor said the state will consider tax credits and tuition assistance to boost its information technology workforce.

"The job openings have been almost constant. We're not solving the problem," said Carl N. Kelly, a vice president at Oracle Corp. who serves on a Virginia commission investigating the state's labor problem.

VALUE AMERICA'S CRAIG WINN: Scholarships are smart

Other states are also developing homegrown IT workforce solutions. Maryland and Pennsylvania this year began offering college students $3,000 annual scholarships to major in IT-related areas. Georgia has had such a program for several years.

States said they need to offer incentives to keep up with demand. The U.S. Department of Commerce recently reported that the country will need some 1.3 million new IT workers by 2006 — nearly double the number of high-tech workers now employed.

But states are putting strings on their scholarship incentives. The students typically must agree to work in their respective state for as many years as they received the scholarship money. If they leave the state, they must pay the scholarships back.

Craig Winn, the founder and chairman of Value America Inc., a Charlottesville, Va.-based Web retailer, called the scholarship programs "just flat-out smart."

Return on Investment

The state will get its scholarship money back through income and sales taxes paid by the graduates of these programs, Winn said. "The state is going to get back more than it gave."

Congress is also considering a bill to help companies with their training needs. U.S. Sen. Kent Conrad, D-N.D., has 10 co-sponsors for a proposal that would provide business tax credits of up to $6,000 per worker for IT training.

But none of these efforts is expected to curtail a Republican-led push in Congress to raise the controversial H-1B visa cap.

When it returns next week from its summer break, Congress will consider several proposals to raise the annual visa cap, which limits the number of foreign workers who can take jobs at U.S. companies. The bills would raise the cap from its current 115,000 ceiling to as high as 200,000.

Foreign workers are needed, Cisco Systems Inc. Chairman John Morgridge said at a meeting on Virginia's labor issues last week at George Mason University in Fairfax, Va.

"We have been fortunate, quite frankly, to have the green card, because it's brought the top minds from all over the world to this country," Morgridge said, referring to the immigration card given to foreign workers.

MOREONLINE

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Continued from page 1

Interns: For Summer and Beyond

as grunt workers," said John Putzier, president of FirStep Inc., a Prospect, Pa.-based human resources consultancy. Only the few firms that don't see the long-term value of interns will feel a big hit when their "slave labor" returns to school, Putzier said.

When companies view interns as potential recruits, they often have them work on interesting three-month projects that don't need full-time staff to take over when the interns leave.

"We try to give our interns meaningful work that has a beginning and an end. That way, they get a sense of accomplishment about what they've done here," said Eva Fujan, vice president of technical recruiting at Inacom Corp., a large Omaha-based systems integrator.

But smaller organizations make sure they don't get hit when school starts. "We set up our interns with one-time projects they can finish while they're here," said Don Harris, Charlotte, N.C.-based manager of staff development at Belk Inc., the largest privately owned department store chain in the U.S.

More Benefits

Even industries that haven't traditionally paid much attention to interns are recognizing the benefits of gaining early access to college students with IT skills.

"In the past, we could have charged interns to work here," chuckled Jeremy Eskenazi, director of workforce planning and strategy at Universal Studios Inc. in Universal City, Calif.

But, he added, "with all of our efforts in new media development, we're now focusing on bringing in good people and then recruiting them for full-time jobs." ◗

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Left to right: Compaq AlphaServer, Compaq ProLiant, Compaq NonStop Himalaya

Better answers.℠

New Low-Fare Airline To Be Quite High Tech

Web- and phone-based ticket system will help JetBlue keep staff numbers low

BY STEWART DECK

THE NEW low-cost but deep-pocketed JetBlue Airways that will start flying out of JFK Airport early next year will have simple check-in kiosks and live satellite TV programming onboard. It will also use a new reservation system operated by Hewlett-Packard Co. that JetBlue CEO David Neeleman said will let the airline run the 25-plane operation with a tiny information technology staff.

JetBlue, whose backers include The Chase Manhattan Corp.'s venture capital arm and financier George Soros, plans to offer fares up to 65% cheaper than its competitors. Its first routes will be to upstate New York and Florida, with service to Washington, Dallas, Chicago and Salt Lake City coming later next year.

Passengers will be able to make JetBlue reservations on the Web and by Touch-Tone telephone. The system will function solely for JetBlue; it isn't tied into any larger reservation system. A spokesman for JetBlue said the firm's startup and first-year IT costs will fall "well below" $1 million.

JetBlue will be using HP's Open Skies reservation system, a multitiered distributed system running on HP 3000 servers that HP operates. The system keeps passenger and reservation data in its HP Turbo Image/SQL database and charges the airlines a per-ticket transaction fee. Open Skies is currently used by more than 10 small airlines worldwide.

Larger airlines use mainframe-based systems to handle the heavy crush of travel agent inquiries and transactions, but Neeleman said JetBlue won't need the power, the additional IT staff or the headaches that come with mainframe systems.

"With mainframes, you have to build a huge infrastructure to support everything coming off disks," Neeleman said. "With a built-in database, you can do your revenue accounting and everything with one system."

> With a built-in database, you can do . . . everything with one system.
>
> DAVID NEELEMAN, CEO, JETBLUE AIRWAYS

Glenn Engel, an analyst at Goldman, Sachs & Co. in New York said this technology will fit in well with JetBlue's low-priced ticket plans. "Most airlines seem to make about 50,000 fare changes a day for better yield management because they have the technology to do so," Engel said. JetBlue executives are counting on low fares and few routes to keep the planes full, making expensive yield-management systems unnecessary.

But the strength of a mainframe system is crucial to large airline reservation systems, said John Viard, director of systems at midsize carrier Southwest Airlines Co. in Dallas, which has about 300 planes. "The reliability and stability of a mainframe is essential to handle the number of transactions and inquiries we do," Viard said.

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Record Management Issues Haunt Archives

Preserving electronic records in a variety of formats will present a big challenge

BY PATRICK THIBODEAU
WASHINGTON

When President Clinton leaves the White House in January, his legacy will include an e-mail system with some 40 million messages in it. Those records, by law, must go to the National Archives and Records Administration (NARA).

The NARA has the task of storing and preserving those messages for as long as it has to, which is pretty much forever. But "for practical purposes, there is no durable digital media," said Kenneth Thibodeau, director of the electronic records program at the NARA.

And that's not the only problem. The volume of records is increasing dramatically as agencies begin turning over records generated on PCs in a variety of formats. In a recent report to Congress, the U.S. General Accounting Office said the National Archives faces a "substantial challenge."

A Super Solution

The NARA thinks that the only way it may be able to keep up with the electronic records boom — from tens of thousands to millions annually — is to replace its homegrown PC system with supercomputers.

It's an effort that may ultimately produce ideas that benefit businesses with long-term records-preservation needs, said users and analysts.

"It certainly is an issue that we're facing and are going to face a lot more as we automate a lot of our health records," said Dave Bowlan, manager of information management at Kaiser Foundation Health Plan Inc. in Pasadena, Calif.

Kaiser is developing a strategy for long-term management of electronic records and will be watching the NARA to see if it can come up with an affordable solution, Bowlan said.

The NARA has been working with the San Diego Supercomputer Center (SDSC) to attempt to resolve the storage issues. Using 1 million e-mail messages as a test, SDSC has "shown us . . . that you can handle this" with massively parallel processing, Thibodeau said.

SDSC is using a supercomputer to speed migrations of data to the new medium, reformat data to meet new standards and import metadata into new catalogs, among other things.

SDSC has also been using Extensible Markup Language tags to keep track of all the documents — something that "has a lot of market support," Thibodeau said.

Long-term storage is another problem because there's no storage medium that can guarantee multidecade life. But moving data to a new medium, as the NARA does every 10 years, actually has benefits. Each new storage medium typically holds more data at a lower cost and also offers improved access to that data, Thibodeau said.

THE ASSOCIATED PRESS

ONE CHALLENGE the National Archives faces is storing and preserving some 40 million messages in the Clinton administration e-mail system

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E-Commerce Sales Tax Should Be Simple

Utah Gov. **Michael Leavitt** has emerged as one of the more outspoken members of the congressionally appointed Advisory Commission on Electronic Commerce. In an interview last week with *Computerworld* reporter Patrick Thibodeau, Leavitt told why he is arguing for a radically simplified sales-tax system, coupled with a requirement that sellers collect taxes from their customers.

MICHAEL LEAVITT, governor of Utah

The 19-member commission is developing a tax recommendation for Congress, due by next April.

Q. What does tax simplification mean and what will it entail?

A. Currently, there are 30,000-plus taxing jurisdictions. In addition, most of those jurisdictions have unique definitions. For example, recently I bought a bottle of peanuts on the Internet. If they were raw peanuts, they would have been taxed in five states. If they were roasted peanuts, they would have been taxed in 17 states. If they were honey roasted, they would have been taxed in 21 states. If they were part of Fiddle Faddle, they would have been taxed in 31 states. So, when I talk about a radical simplification, I'm talking about creating a system that uses technology to manage that problem. But it will also need to include a dramatic simplification of the number of definitions that are used.

Q. Is this an issue of applying existing or new taxes to e-commerce?

A. I personally oppose any new tax on the Internet itself. The National Governor's Association opposes it as well. All we are working to accomplish is to create a system that treats purchases equally, no matter what the medium.

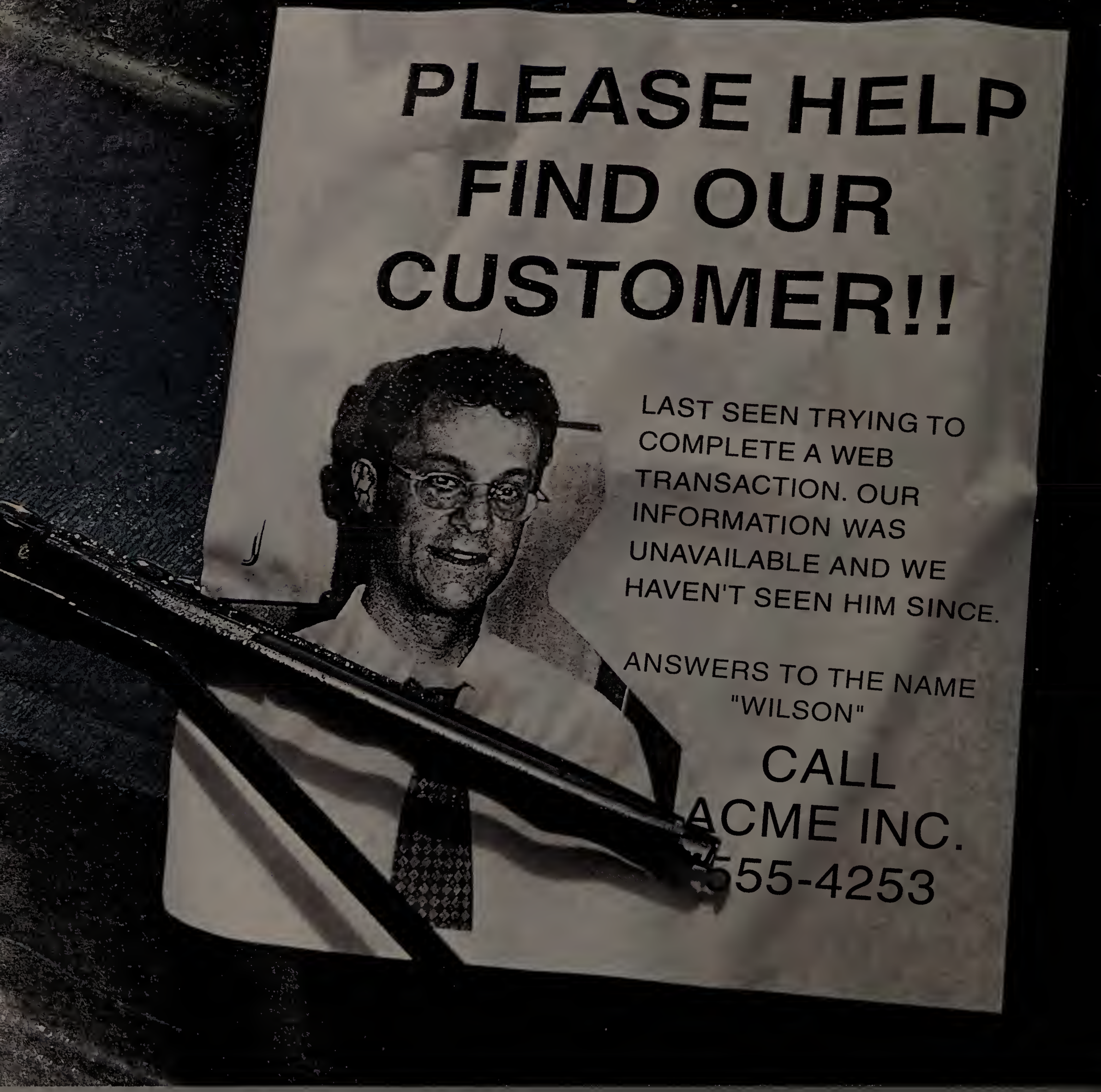
Q. Some states like California have taken a very anti-Internet tax approach. What impact will that have?

A. There are five states that have no sales tax, and they do it to maintain a competitive advantage. If California opts to have a zero tax rate on electronic commerce, then more power to them.

On the other hand, California is going to have to finance their schools like everyone else, and if they can find a way to do without it, I'll be anxious to learn from them.

Q. If Congress makes the Internet Tax Freedom Act permanent, what would be the impact?

A. That tax freedom act has no impact on the ability for states to collect sale taxes on transactions. It does put a three-year moratorium on any tax related to the Internet, it prohibits any bandwidth taxes, bit taxes, multiple taxes, discriminatory taxes. I supported that bill. ◗



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Team Exposes Encryption Key Weakness

BY ANN HARRISON

The fact that an international team of cryptographic researchers broke the 512-bit RSA key used to secure many e-commerce transactions doesn't mean 512-bit keys are suddenly risky, a security consultant said.

Bruce Schneier, president of Counterpane Systems, a Minneapolis-based computer security and cryptography consulting firm, said there are no implications for e-commerce that weren't already true prior to the announcement.

"They have been risky for the better part of a decade; anyone who has studied the issue knows that," Schneier said.

RSA Data Security Inc. in San Mateo, Calif., said Aug. 26 that a team in its RSA Factoring Challenge competition had factored a 512-bit, or 155-digit, number of the type used for public-key cryptography. The group, affiliated with the National Research Institute for Mathematics and Computer Science in Amsterdam, took months to determine the two prime numbers used to generate a single 512-bit RSA key. That data could be used to decode encrypted information.

In a statement, RSA said the result "reconfirms RSA's ongoing recommendation for using 768-bit keys as the minimum for achieving reliable security."

According to RSA, the team used 292 individual computers at 11 sites around the world. Machines used included 160 Silicon Graphics Inc. and Sun Microsystems Inc. workstations and 120 Pentium II PCs.

Schneier noted that the same problem could be solved in about a week by networking several machines over the Internet, a strategy similar to one used to crack the Data Encryption Standard (DES).

Factoring a 512-bit number in this fashion would be 50 times easier than cracking DES, noted Schneier. He said this shows that other organizations could already be regularly breaking e-commerce keys.

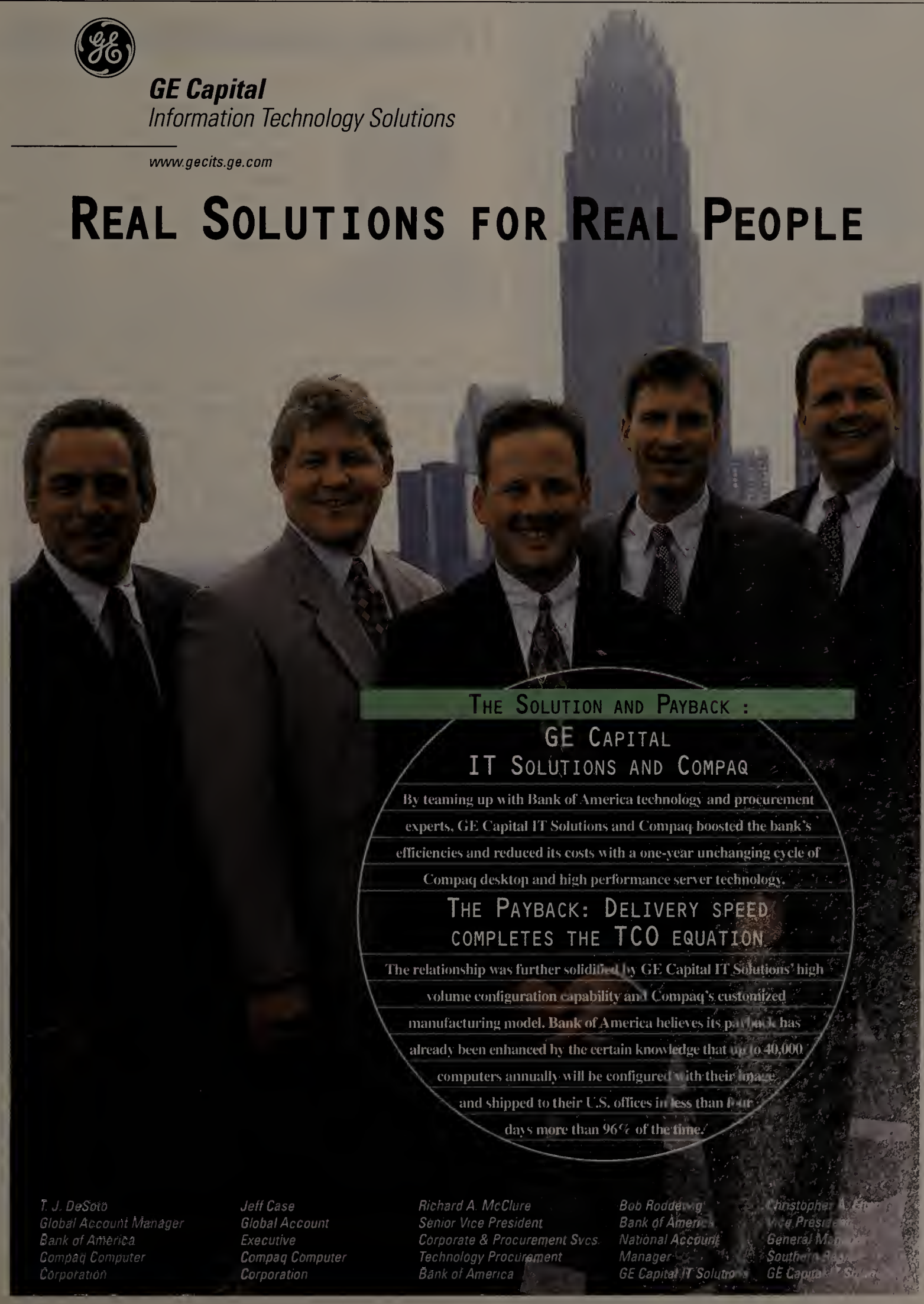
"Factoring e-commerce keys is definitely very practical and will become even more so in future years," he said. "This is not a theoretical break."

Feds Arrest Teen Hacker

BY KATHLEEN OHLSON

The Department of Justice has arrested and charged the alleged leader of hacker group Global Hell with breaking into a U.S. Army computer at the Pentagon.

According to an affidavit filed in U.S. District Court in Green Bay, Chad Davis, 19, of Green Bay, Wis., illegally accessed an Army Web page and changed its contents and also tapped into an unclassified Army network, removing and modifying its computer files to prevent detection.



Point of View

Repurposing the South China Morning Post

To call July 1, 1997 a big-news day for the South China Morning Post (SCMP) would be a bit of an understatement. For Hong Kong's 250,000 subscriber-strong English-language newspaper — and every other news outlet in the world — the handover of the British colony to Chinese rule would be one of the most important stories of the decade. The newspaper, nearly a century old, planned to capture the ceremonies with a live 30-hour Webcast, delivered via secured servers in Hong Kong, Singapore, San Francisco, and Vancouver.

But, for the paper, as well as for the dynamic city it covers, July 1, 1997 was an historic stepping-off point, not just in terms of news coverage, but also in terms of technology. The multimedia "Countdown to History" Webcast was the first step in SCMP's ambitious plan to deliver a host of Internet services, transforming the company from the publisher of the SCMP broadsheet into a multiplatform information provider that would supply late-breaking news, classified ads, e-commerce, and real-time video streaming via its Web site.

But before the SCMP could do any of those things, its IT department had to prove itself with the handover Webcast. That meant first choosing a technology platform capable of providing fault-tolerant performance, flexibility, and scalability (the Web site got more than 6 million hits on the day before the Chinese takeover), while still taking into consideration the company's stringent time-to-

Continues on far right

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Hiring consultants vs. contractors:

By Steven Gould

I am frequently asked by my clients to expound on the differences between consultants and contractors. Many, if not all medium and large companies with an IT department frequently use these third parties. It's important for me to state up-front that I'm a professional consultant.

The line between the roles of a consultant and a contractor is thin — and sometime it blurs. Some of the more experienced and business-minded contractors may be able to provide some of the services normally provided by a consultant. A consultant, however, should always be able to fill a contractor's position.

When hiring a contractor, you typically deal with one of the many "body shops" and review a handful of resumes. You then select the individuals whom you are interested in interviewing based entirely on their specific job skills. For example, if you know you need a Visual C++ programmer, you try to identify someone with Visual C++ experience.

The people you interview in this way are effectively individual contractors represented by a larger contracting agency. As their contract with you approaches its end, they are likely to begin

Standardizing IT environments viewed as

Microsoft, Compaq offering critical components for integration

If you're running a typical Windows-based IT environment today, chances are good that it consists of more than one Windows operating system. Your users could be running Windows 3.1 and Windows 95, or Windows 95 and Windows 98. Count Windows NT as part of your environment, or throw a few Unix boxes on top, and you'll soon have your network administrators running in circles without a compass.

So what do you do? Standardize.

Standardizing your software and hardware offers a wealth of benefits. It helps you reduce overhead, improving your bottom line while minimizing potential headaches for network administrators and service and support teams.

So, how do you as an IT manager standardize these desktop environments easily and efficiently? What hardware and software systems should you implement to make your assorted Windows software (and, sometimes, software for Unix systems) operate in sync? How do you make the transition to a standardized environment easier for administrators, while at the same time increasing the efficiency of network management after the environment is standardized?

Buying hardware and software is easier, faster, and cheaper when the hardware and software are standardized. Having your organization choose one or two specific platforms, operating systems, and software-configuration "profiles" to create a consistent, standardized IT environment enables you to work with vendors to purchase equipment and software in larger quantities at discounted prices.

Additionally, it takes less time to buy hardware and software when those purchases go through a central department, such as the MIS department. When individual departments make their own purchases, they typically have to complete a purchase order for each piece of equipment or software they want to obtain. This lengthens the procurement process and places a heavy administrative burden on each department, says Mike Clark, Vice President of the High-Availability Segment for Compaq Computer Corp.'s Industry Standard Server Division.

If individual departments, such as marketing or accounting, are left on their own to determine what hardware and software to purchase for their end users, their purchases are likely to be inconsistent with the rest of the organization. This moves the organization further away from a standardized IT environment. A central purchasing department enables the organization as a whole

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Advantage

Point of View

the important issues to consider

looking for their next assignment, since they are typically paid by the hour, and only for those hours billed.

When dealing with contractors, you will find that they typically do only the task or tasks that you assign them, leaving you in total control of the project scope, deadlines, and budget. This can be a very beneficial relationship for you, your company, and the contractor.

A consultant is a full-service, experienced professional who walks in with a broad range of skills and a good business perspective. An effective consultant is better able to advise you about different technologies, and the advantages and disadvantages of each when applied to your business situation. A consultant is able to assist you with strategic planning and goal setting, provide full life-cycle support, and help you meet your deadlines. In this way the consultant shares, and in some cases owns, responsibility for the success of the project.

Consultants should not only accomplish the immediate task at hand, but also provide a complete business solution, making your job as an IT manager easier.

In most cases, consultants work for a large, diverse consulting company. This enables them to draw on a substantial pool of talent, both in technical and business arenas. The relationship between you and a consultant is much more than a relationship between two individuals; your relationship extends to the entire consulting organization. This type of relationship often lasts longer and is beneficial to all involved.

For more on consultants vs. contractors, visit www.WindowsNT-Advantage.com

key to productivity
migration efforts

to channel acquisition requests more efficiently and better monitor what hardware and software is running in each department.

Standardizing hardware and software configurations across the enterprise allows your organization to manage inventory better, because the software running on all systems will be familiar to you. Microsoft's Systems Management Server 2.0 (SMS) helps network administrators manage both Windows-based desktops and servers and the software they're running. It provides your network administrators with inventory management, distribution, and diagnostic tools for both 16-bit and 32-bit Windows-based clients.

Welcome to Windows NT Advantage, the strategic information magazine for IT leaders.

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market and cost issues. After giving due consideration to a RISC-based solution from Sun Microsystems, SCMP decided that the best way to achieve its goals would be to commit itself to a muscular Compaq-Microsoft combination that included Compaq ProLiant servers running Windows NT Server, NetShow, and SQL Server.

Of course, some things are beyond even a good system's control. Fifteen minutes before the handover ceremonies were slated to begin, power was interrupted more than a dozen times at the central server in the Hong Kong Convention & Exhibition Center, and there was no UPS back-up. There was simply no time to reinstall software or reformat hard drives.

Fortunately, ProLiant servers know how to recover under extreme situations. Every time the power cut out, the Compaq servers rebooted themselves with no problems and carried on as they had before, according to Chris Justice, who at the time was manager of PostNeT, SCMP's Electronic Information Division. In the end, and to the relief of virtually an entire city, the Webcast performed flawlessly.

Two years later, the Compaq-Microsoft solution has proved its scalability at a cost several times less than that of the Sun solution, according to Justice. Today, in addition to replicating much of the printed version, SCMP's Internet edition includes such value-added features as Global Investor, a subscription-based business information service providing access to more than 4,000 newspapers, magazines, and trade journals worldwide.

Users also have access to a personal investment weekly magazine, the online Classified Post Interactive section, horse racing information, a business and humor site called Spice, personal ads, a guide to Hong Kong hotels, and a shopping area.

BRIEFS

IBM, Cisco Strike Deal

IBM last week struck a $2 billion agreement with Cisco Systems Inc. to supply Cisco with network technology, components and services over the next five years, the companies announced. Kevin Reardon, director of strategy for IBM's technology group, said the agreement was an opportunity for IBM to venture into the voice-data arena, as well as focus on its communications technology, services and software.

Intel Gets NetBoost

Intel Corp. will acquire communications hardware and software vendor NetBoost Corp. in Mountain View, Calif., in an all-cash transaction. Financial terms weren't disclosed. NetBoost's PolicyWare products provide a platform for deploying applications across the network.

Baan Buys Neighbor

Baan Co. last week announced the acquisition of fellow Dutch business software producer Proloq Holding BV. Baan and Proloq have a history of jointly producing and supplying industry-specific applications, primarily for the cable and wire, pulp and paper, and metal industries. Financial terms weren't disclosed.

Madge Expands

Madge.Connect, a subsidiary of Madge Networks N.V. in Wexham Springs, U.K., last week paid $15 million for Olicom A/S's Token Ring business. The buy solidifies Madge's position as the leader in the slow- to no-growth, $1.4 billion Token Ring network market.

Short Takes

COREL CORP. last week announced that it has entered into a memorandum of understanding with the plaintiff in a suit brought by GREAT NECK CAPITAL APPRECIATION INVESTMENT PARTNERSHIP and others, on behalf of a purported class of shareholders. . . . Disk drive maker SEAGATE TECHNOLOGY INC. said it will cut 1,000 workers from four production facilities and its customer service operation in Singapore by the end of this month as part of a global restructuring drive.

Sun Acquires Star Power

Sun to offer free StarPortal office suite, looks to support, hardware for revenue

BY JAIKUMAR VIJAYAN

SUN MICROSYSTEMS Inc.'s strategy to offer free office productivity software over the Web taps a growing user interest in hosted Internet applications.

As expected, Sun last week announced that it will acquire Star Division Inc., a Fremont, Calif.-based software company that was originally located in Germany.

The acquisition sets the stage for Sun to introduce StarPortal, a free Web-based version of Star's StarOffice suite of office productivity software, early next year.

The portal will allow users to access Web-enabled office productivity software — including word processing, presentation graphics, spreadsheets and other office functions — through any Web browser.

Microsoft Corp. also plans to offer its applications over the Web in the future, according to president Steve Ballmer, speaking at a press conference last week. But no time line has been set. (See story, page 4)

Service Angle

Sun is currently trying to sign up Internet service providers and applications hosting services to offer StarPortal applications as part of their hosted service portfolios. For instance, AT&T Corp. plans to offer StarPortal as part of its services to business customers when the suite becomes available.

Sun's goal is to promote user interest in renting core applications over the Internet, said Joyce Becknell, an analyst at Aberdeen Group Inc. in Boston. In May, for instance, Sun launched a program called ServiceProvider.Com to sell hardware, software and services to application hosting vendors and Internet service providers [News, May 5].

"Sun is just trying to make sure that service vendors have the tools and applications that will make such services viable [for more users]," Becknell said.

Rentable Internet applications are usually ready-made software that runs on remote servers hosted and managed by service providers and accessed by users via browsers. Forrester Research Inc. in Cambridge, Mass., projects that the market for such services will be worth $6.4 billion by 2001.

Star Report

What Sun is doing with the StarOffice suite it acquired from Star Division:

- Making free copies of the software available for download at *www.sun.com/staroffice.*
- Introducing a free Web-based version of the suite called StarPortal early next year.
- Signing up Internet service providers and application service providers to host StarPortal, including AT&T, AOL, BellSouth and Earthlink.

Boosting Credibility

The primary user appeal of such hosted applications is the lower up-front costs and reduced administrative hassles, said Marco Boerries, CEO of Star Division.

Sun's revenue will mainly come from selling the software support services and the large server hardware required by service providers to host the applications, Boerries said.

Sun's latest move "should really lend credibility to, and ammunition for, the service provider business model that Sun is pushing so strongly," said Thomas Kucharvy, president of Summit Strategies Inc., a Boston-based consultancy.

> [This deal] should really lend credibility to . . . the service provider business model that Sun is pushing so strongly.
>
> THOMAS KUCHARVY, PRESIDENT, SUMMIT STRATEGIES INC.

"It will also make it easier for Sun to launch a more credible entry into the business client [application] market" in the future, Kucharvy added.

Deal Extends SAP's Warehouse Capabilities

Stake in Catalyst puts R/3's reach in larger warehouses

BY CRAIG STEDMAN

Looking for help in filling a big hole in its R/3 applications, SAP AG last week bought a minority stake in warehouse management software vendor Catalyst International Inc.

SAP paid $12.9 million to acquire 9.7% of Milwaukee-based Catalyst's stock. As part of the deal, the two companies also plan to develop an interface between SAP's logistics applications and Catalyst's warehousing system.

SAP has built basic warehouse management capabilities in to R/3's logistics modules, but it said users will be able to manage higher-volume and more complex distribution centers with the Catalyst Warehouse Management System (WMS) software.

About 25 R/3 users, including Indianapolis-based pharmaceutical giant Eli Lilly and Co. and footwear maker Reebok International Ltd. in Stoughton, Mass., have already opted to use Catalyst WMS in their warehouses instead of SAP's technology.

The warehouse management software built in to R/3 is suitable "only for very small and basic warehousing operations," said Chris Newton, an analyst at Boston-based AMR Research Inc. "What SAP has is basically a stock-locator system."

R/3 can tell warehouse workers where items are stored, Newton said, but it doesn't handle jobs like putting together optimized product-picking routes, nor does it have built-in support for scanning in data with handheld radio-frequency devices.

Catalyst will also now take the lead in training and supporting users who are doing a mixed installation of R/3 and its software, the two companies said. A schedule for delivering the new interface between the applications wasn't disclosed.

The deal lets Catalyst continue selling its software for use with other enterprise resource planning systems. However, the company said it's stopping work on a lower-end Windows NT product that would have directly competed with SAP's warehousing module.

JUST THE FACTS

SAP's Warehouse Helper

Vendor: Catalyst International Inc.

Headquarters: Milwaukee

Number of users: 100 total, of which 25 run R/3

1998 revenue: $33M

Supported technology: Unix systems, multiple databases

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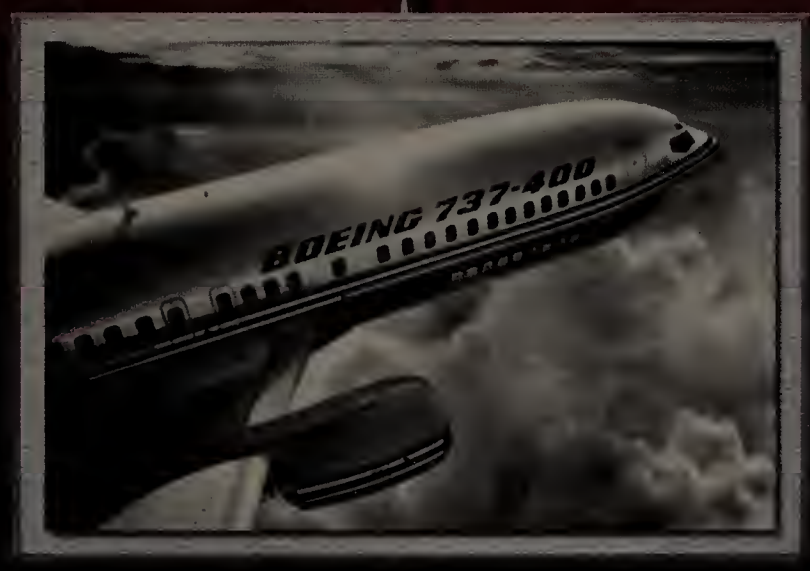

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MARK HALL

Life is cheap

SAD BUT TRUE, life is cheap on parts of this planet. But in the virtual world, it costs a mere $3.30. You can get the goods on someone in cyberspace for the price of 10 first-class stamps. At least that's what Postage4free.com is betting on. This dubious enterprise makes its money by selling detailed demographic information on its self-selected, self-defined participants.

MARK HALL is *Computerworld*'s West Coast bureau chief. You can contact him at mark_hall@computerworld.com.

For revealing their innermost consumer habits, people are sent a paltry 10 prestamped envelopes festooned with promotions designed specifically for the recipient, or, more likely, whatever the company has on hand in the storeroom.

It's perversely ironic that this dot.com company is using the medium that brought us global e-mail to bribe its victims with junk snail mail. This is one e-commerce team I hope never reaches the IPO stage.

The company swears it will market the data collected only in aggregate and never sell anything specific about an individual. And I'll give the company credit for posting its privacy policy prominently and writing it so people, and not just lawyers, can understand it. Still, given a recent court ruling that halted FCC efforts to regulate the phone companies' use of White Pages data, it won't take a marketing genius to glean very precise consumer information by simply overlaying phone book facts with Postage4free.com profiles. Given the unscientific, self-selective nature of Postage4free.com's data, it's useful to marketers only when cross-tabbed with White Pages-like information.

But consumer privacy issues aren't what should get your blood boiling. Sure, companies like Postage4free.com give IT and the Internet a bad name — which might upset a few of you more sensitive types — but there are practical problems caused by Postage4free.com and its ilk that should really get you angry.

Postage4free.com offers additional free postage if people also squeal on their friends and associates by handing over their e-mail addresses. That could mean increased traffic on your organization's network and more administrative hassles trying to filter increased spam and chain e-mail. It'll cost you headaches, time and money. Maybe the price of a life online isn't so cheap after all. ◗

ROBERT B. REICH

Coping with the U.S. shortage of high-tech workers

THE BIGGEST threat to America's booming IT sector is a severe shortage of skilled people. Some estimates put the current shortfall at 400,000. What's to be done?

In most industries facing such shortages, salary levels rise until enough people are attracted to fill the need. Supply responds to demand.

But, as you'll see in *Computerworld*'s 13th Annual Salary Survey ["Return to Sanity," page 42], salaries in the corporate IT sector have been rising no faster than in most other parts of the economy. There's no beating the free market: If the IT sector wants more skilled people, it is going to have to pay for them.

ROBERT B. REICH, a former Labor Department secretary, is professor of social and economic policy at Brandeis University in Waltham, Mass. Contact him at reich@brandeis.edu.

And salaries don't even tell the whole story. IT jobs are becoming less secure. The half-life of a software engineer is coming to resemble that of a professional athlete. One recent survey shows that six years after getting their computer science degrees, 60% of graduates are working as software engineers; 20 years out, only 19% are still at it. And the falloff seems to be getting steeper.

Many IT professionals tell me it's hard to keep up. When technology is continuously exploding, as in IT, long-term experience counts for less. Some IT professionals luck out by catching the right wave. But others tank, or they catch the wrong wave and get beached.

Starting salaries don't make up for the risky ride. Young people aren't dumb. Despite the generous terms, they see the risk ahead, and they decide against IT.

So what can IT organizations and companies do about this, in addition to paying more? First: Give stock options. That way, IT professionals can get a piece of the action even if their skills suddenly become obsolete.

Second: Help IT professionals keep their skills sharp. Move them into projects on the cutting edge. Rotate them, so they get exposed to a lot of new ideas.

Third: Grow your own. Just two weeks ago, major IT employers in Omaha unveiled a $70 million

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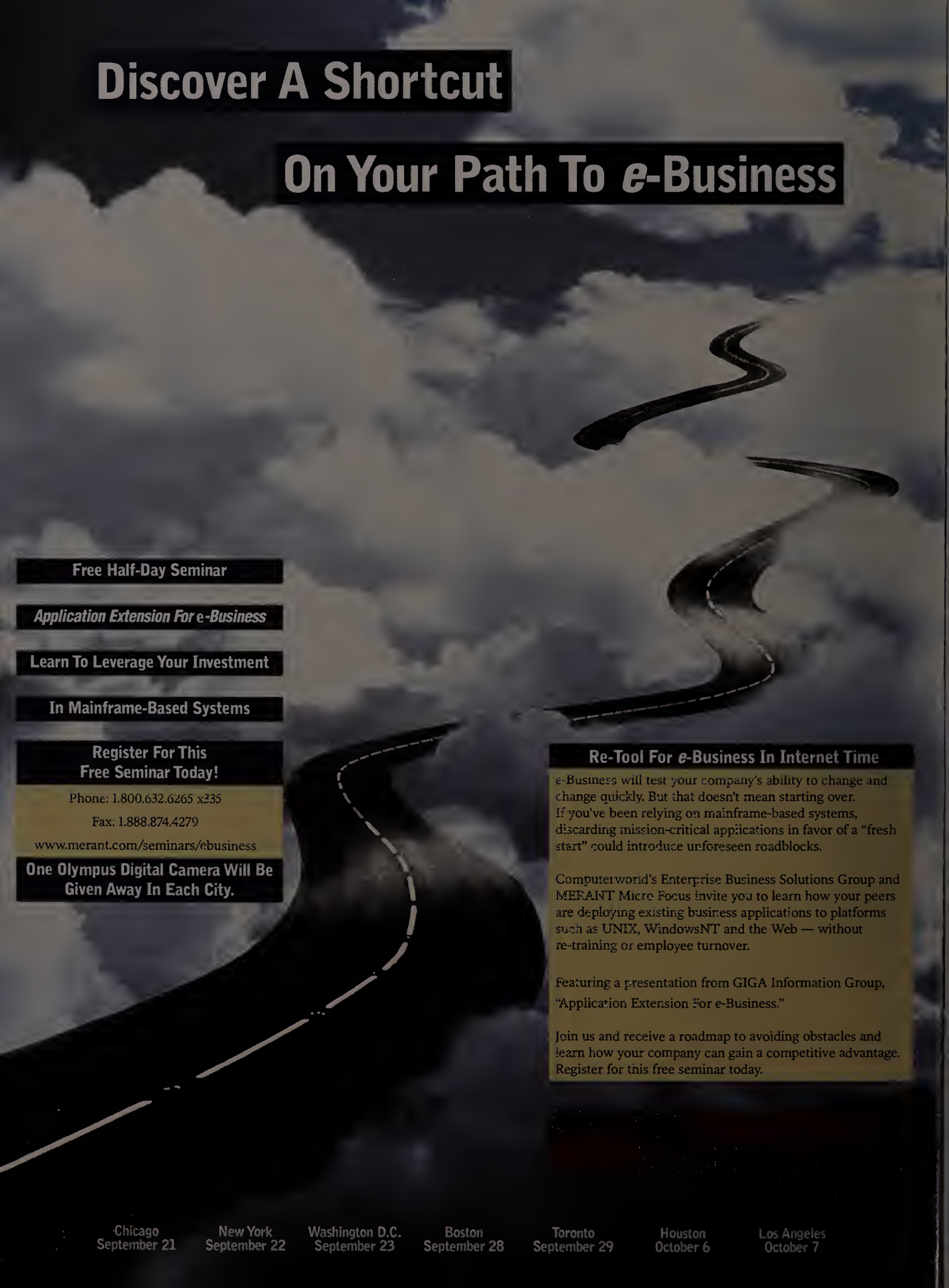

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Mainframe Apps Meet the New Millennium

By Sally J. Cusack, *International Data Corp.*

THE CORPORATE INFORMATION-TECHNOLOGY community is in a frenzy these days. The common goal is to create exciting, easy-to-use front-ends to entice Web surfers into e-business initiatives.

As developers work through the design process, they learn that robust Internet solutions require true scalability, reliability and extensibility in a distributed computing environment. The screens must be quickly and easily modifiable, and the sites must be able to link users to existing data stores and resources on back-end systems.

However, few (if any) organizations have the luxury of designing and developing their Web offerings on a clean slate. Indeed, corporate America still largely depends on business data and programs developed over the past two decades. Of course most companies have modified their run-your-business applications over the years to some degree, but few Fortune 2000 firms are lining up to rewrite their tried-and-true legacy applications.

"Research shows that many IT leaders will maintain a large investment in COBOL long after we cross the Y2K bridge. And vendors are responding with products that make the legacy-to-Web transition very straightforward."

Sally J. Cusack, Research Manager, IDC

In fact, to many a mainframe maker's delight, the majority are electing to keep mission-critical data intact on the mainframe and access it via various methods to utilize it as an effective back-end for e-business solutions.

Enter the current rage for application servers. Application servers started becoming a household word about 18 months ago, driven by several market phenomena: The Internet craze was catching fire, Sun Microsystems' Java language was maturing as a common denominator in universal language communication, and object technology and middleware were showing real potential for portability and reuse among corporate users and customers alike. Consequently, corporations sat up and took notice of an opportunity to reach millions, perhaps billions, of customers with goods and services online. What corporate IT leaders learned, however, from failed scalability attempts with fat-client, two-tier client/server systems in previous years, is that this new breed of distributed application requires an intermediate (or middle-tier) platform to achieve performance, reliability and scale. Application servers, while not a new concept, took on new significance as the means of enabling e-business transactions.

International Data Corp. (IDC) defines application servers as software functionality that resides in an architectural sense between client processes on the front-end and data/applications on the back-end. They can also provide an integration capability among different application and data resources. An application server provides the processing and infrastructure required to implement full bi-directional access and achieve that integration capability. It is important to realize that an application server, in terms of its actual deployment and implementation, is a platform, on top of which reside the services and functionality required to accomplish various tasks associated with implementing multi-tier, enterprise solutions.

This definition does not specifically require that the application server reside on a middle tier, however. Some application servers that are focused on data access, for example, may reside on the system on which the data or applications being accessed reside, such as a legacy mainframe or minicomputer. In most scenarios today, how-

Application Extension for *e*-Business

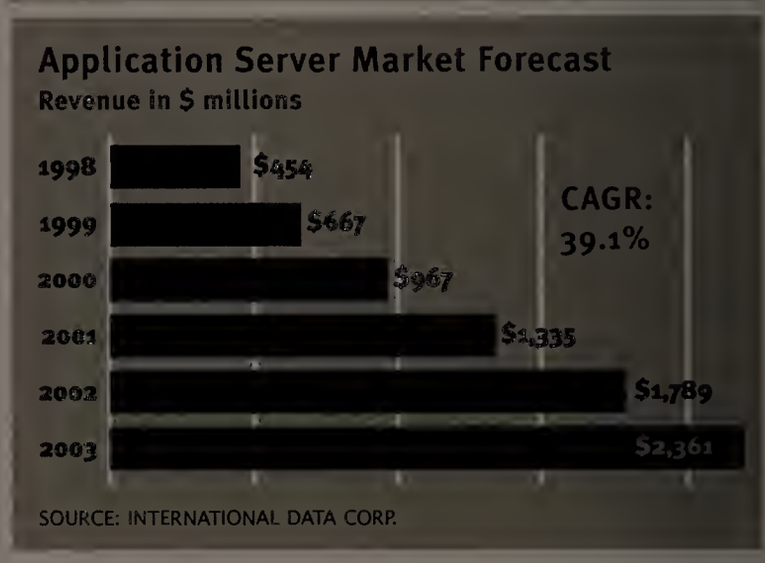
ever, application servers are middle-tier entities, which are today essential elements of multi-tier, Internet-enabled environments.

Linking legacy applications and data into the newer environments is a primary function of many application servers. This is often accomplished via component interfaces to standards, such as Microsoft's COM and Object Management Group's CORBA. Without the ability to reuse the business logic in a distributed environment, much of the benefit of an application server platform would be lost. Therefore, corporate customers should look for vendor-provided solutions that offer component interfaces to the aforementioned industry middleware standards. There are application servers capable of automatically generating COM and CORBA components from existing legacy code via simple wrappering techniques. This can be an optimal choice for firms looking to preserve investment in existing staff skills, while automating their applications or moving to the Web.

Another issue that is often overlooked in the rush to Web-enablement is the need to preserve existing skills within the corporate IT community. Research has shown that a large number of IT shops and ISVs maintain a large investment in COBOL, both in programmers and applications. While these companies plan to use Microsoft NT or some variety of Unix servers for their distributed applications development, going forward, they need heterogeneous data access to mainframes, Unix and NT. Added to this mix is the need to rapidly move existing run-your-business applications to a Web-access environment.

While Java is the language du jour at the turn of the century, the fact remains that it is only five years old and the majority of today's back-end, run-your-business systems are written in languages such as COBOL. And the need for COBOL expertise is not going to disappear after we cross the Y2K bridge. According to IDC's Software Developers Model, there are more than 1.5-million COBOL seats worldwide in 1999. IDC forecasts that the number of COBOL seats worldwide will still exceed 1 million well into the next millennium.

With this weighty customer investment in both COBOL skills and business logic, seasoned vendors in the application-server area are creating product offerings designed to make the transition from legacy-to-Web as straightforward as possible.



The goal is to preserve the value of the old while enabling it to interact, undiluted, with the new. And research shows that the drive for Web enablement isn't slowing: IDC research reveals that technology consumer spending on Internet and e-commerce site development will grow from $11.8 billion in 1999 to $43.6 billion worldwide by the year 2002. If organizations can achieve their e-business goals while leveraging existing expertise and data from within, their potential benefits are indeed much greater. ■

Sally J. Cusack is a research manager with IDC, specializing in components, objects, and development environments and Java. With over 15 years' experience in the IT market, she is a frequent contributor to industry publications and events.

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Set a Course to e-Business

You Can Get There From Here

The benefits of broadening your business's horizons to the Internet are clear. Less so is the path to implementing an e-business initiative. But you need to look no farther than your existing COBOL-based IT infrastructure to launch into the e-world.

ORGANIZATIONS LARGE AND SMALL ARE BUSY building e-business solutions—those that combine the reach of the Internet with the vast resources of traditional IT systems. Spending on such technology initiatives will reach $43.6 billion worldwide by 2002, according to IDC's research on Internet and e-commerce site development. The draw for these firms is to be able to open new markets, improve their bottom lines, increase their competitiveness, offer 24x7 availability and elevate customer satisfaction. But the fundamental question facing all IT executives and managers when contemplating online initiatives is, how best to proceed from where they are today to their desired destiny in cyberspace.

Choosing the right path—the one with the most cost-effective and performance-savvy solution—can make or break an e-business initiative. As IT organizations assess their enterprise-level e-business options, there's no shortage of voices advocating that they build totally new systems from the ground up. New architectures such as COM, ActiveX and CORBA, after all, were developed with distributed computing in mind. These architectures may offer the optimal approach for start-up companies that are just entering the market, but the fact is that most established organizations have an incalculable investment in their existing COBOL-based IT assets. Discarding reliable and often mission-critical systems in favor of a "fresh start" just isn't practical or wise for most experienced IT organizations. More important, it may not be necessary.

The optimal approach for established IT organizations may be to find a way to take advantage of the new architectures while leveraging their valuable business applications, data and back-end systems.

GETTING THE MOST FROM WHAT YOU ALREADY HAVE

Practicality is the motive for many organizations that choose to leverage time-tested COBOL code running their core business applications. Some of the advantages of doing so include risk reduction, time to market, system integration, return on current investments, availability of in-house staff resources and the ability to extend existing application knowledge into the Internet realm.

Any CIO who has undertaken the development of a new e-business system knows the risk factors. For starters, there's an ever-present risk that these projects will take longer than anticipated or cost more money than budgeted. There are additional risks associated with the inevitable communication gaps that can happen between critical players, not to mention the possibility of hiring the wrong consultants to implement the project. Of course, the possible lack of a thorough understanding of the fundamental issues, technologies and architectures involved can slow down any ambitious new IT project.

In addition, organizations have to contend with a shortage of people who are really good at this sort of deliverable and who are currently available to roll up their sleeves and do the necessary work. Finally, there's

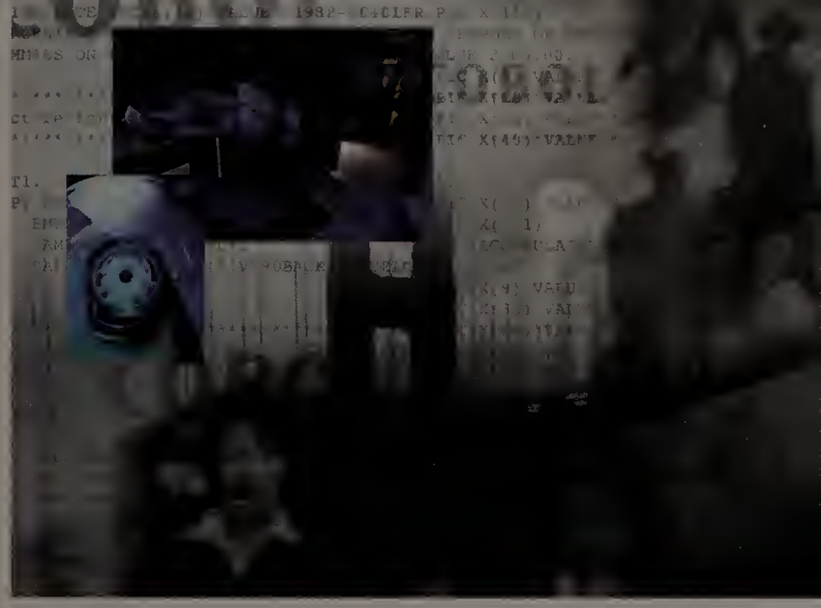
the risk of overlooking the staff knowledge base that already resides within an organization and could ease the process and add to the success of bringing e-business capabilities online.

WEIGH THE RESOURCE RISKS

Any or all of these risk factors can have a profound impact on your ultimate time-to-market as well. To say that business dynamics change rapidly in the Internet space is to understate the urgency to get Web-based business systems up and running quickly.

New companies are moving into well-established markets in every viable category with tremendous drive and agility. Not to be outdone, traditional competitors are expanding into the e-business realm with new levels of service, innovation and competitiveness. If time equals money, then time to market equals market share.

System integration—connecting front-end systems with the mainframe—opens up a broad range of interesting possibilities, and additional challenges for the IT decision maker. According to International Data Corp., only about 10 percent of new e-business systems are actually integrated with back-end systems. It's one thing to set up a server to handle Web access, and quite another to enable a client browser to interface with various data and applications on the mainframe.



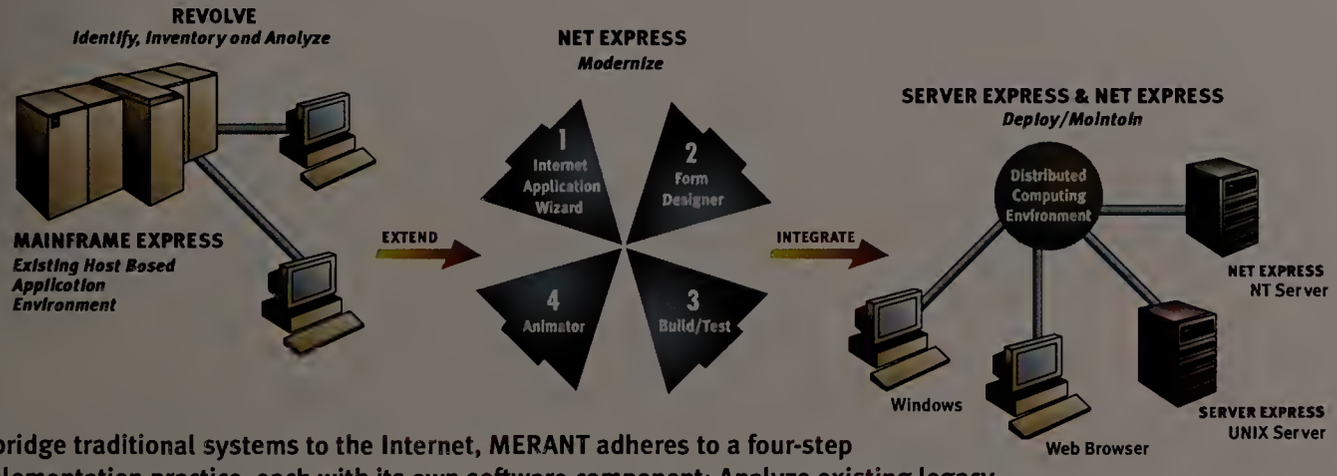
From airline reservations to insurance claims processing, most large IT organizations have a tremendous investment in mainframe-based computing systems that are running their business today. They can't afford to walk away from those systems. The trick is to continue leveraging the underlying business logic running on firmly established computing systems while presenting an attractive front-end to users at the desktop. By doing this efficiently, organizations can achieve a reasonable return on investment on current IT assets as they embark on e-business initiatives. ■

The Migration Process at a Glance

One solution provider offers an inside look at bridging legacy assets to new distributed computing and e-business applications.

Successfully extending existing COBOL-based systems to the Internet means marrying Web and component technology to the traditional values of the enterprise: reliability, availability and scalability. Mountain View, CA-based MERANT offers a family of solutions specifically aimed at migrating companies' current COBOL-based assets.

The vendor's solution combines the Internet and traditional systems employing the benefits of a Windows platform, graphical user interfaces, and object-oriented development and component technology, as well as mainframe and data connectivity.



To bridge traditional systems to the Internet, MERANT adheres to a four-step implementation practice, each with its own software component: Analyze existing legacy applications to understand their structure and the business rules they automate; extend existing legacy applications to the Internet and distributed servers; integrate new component-based technology, as appropriate; and deploy the modernized applications across a distributed, multi-tiered architecture.

Electric Insurance Bridges Service to the Web

In its pursuit of innovative customer service, one company learns that the past can be the best link to future. By extending years of compiled COBOL code to a Web platform, Electric Insurance improved internal operations and empowered its customers with service just a click away.

TO REMAIN COMPETITIVE IN the insurance market, Beverly, MA-based Electric Insurance Co. wanted to leverage the Web to build a cost-effective and efficient means of offering auto insurance. As a direct writer of vehicle and home insurance in 47 states, Electric Insurance had a lot of policy information to migrate to the Web: 100,000 lines of code, to be exact.

"For any company attempting to expand through technology and continue to use COBOL as its primary development language, Net Express is the solution to get you there."

Ken Wolff, *Manager of Web & Marketing Systems, Electric Insurance Co.*

Electric INSURANCE COMPANY

Realizing the potential a Web resource would have on operations, sales and customer support, the company put its Web application development team to the task of building an online policy quoting and ordering system. Job one for the team was to seamlessly move existing COBOL applications from the mainframe to a Web platform. "We needed a solution that would take existing information to new environments efficiently and without additional resources," says Ken Wolff, Electric Insurance's manager of Web and Marketing Systems. "To create the online infrastructure, we had to migrate our existing 100,000 lines of auto rating code from the mainframe, replace VSAM files access with database queries and provide connectivity to our Web site," says Wolff.

"Most important, we needed the code to communicate with the numerous database platform and Web environments, ultimately making it available to potential customers," he adds.

Already familiar with Micro Focus Workbench, the development team selected MERANT's Net Express to debug and migrate the existing COBOL code to the Web. They used Net Express to migrate the auto rating applications from the mainframe, debug and route the applications to the PC and develop embedded SQL calls into a Sybase database. "Net Express provided a technical solution that enabled us to leverage our in-house COBOL resources instead of redeveloping in a new language."

The online quoting system went live with the first state in 1996. This first phase of the project was a success: Customers submit personal, automobile, and driving information and receive a quote in about 20 seconds.

Taking IT to the Next Level

Electric Insurance knew the next logical business step was to bring the actual purchasing process online. So in October of 1998, the firm partnered with Quicken InsureMarket to offer

purchasing directly via the Web. By accessing the Quicken InsureMarket site, customers can locate the most competitive auto-insurance premium from several insurance companies, including Electric Insurance.

Net Express was again used to develop the COBOL interface program that accepts data from Quicken InsureMarket, and transfers data to the Electric Insurance database. A second Net Express program was developed to read the data and generate a quote back to the Quicken InsureMarket, reformatted and downloaded to the user in about 30 seconds.

Measuring Success

Since going live, Electric has seen a dramatic increase in Web-site activity, and the number of policies originating from the Web. "Customers now have the ability to get automated quotes in a matter of seconds, and Electric Insurance was able to reduce the call center support time by 20 minutes per customer, thereby decreasing the overall time to finalize a policy to about five minutes." Wolff concludes, "Net Express was basically an out-of-the-box solution that required minimal training. Without it, we would still be writing code and the projects would have been a year or two effort instead of six months." ■

Vulcan Unearths the Benefits of Legacy Application Extension

Birmingham, AL-based aggregate supplier moves mountains on a daily basis. Moving its COBOL-based billing application to a distributed IT environment presented new obstacles. But by linking legacy code with new technology, Vulcan's ROI and residual benefits are piling up.

AT VULCAN MATERIALS CO., they're not afraid of tackling big jobs. With record revenue of $1.7 billion in 1998, Vulcan is the largest U.S. producer of construction aggregates, namely crushed stone. It serves 20 states from 330 facilities, and each division has to track its daily accounts and material reports from area quarries. So, when it came time to migrate the Midwest Division's plant billing application from an obsolete hardware platform earlier this year, Vulcan went about mining the right technology tool for the job.

"If I had to pick the most mission-critical application at our company, it would be our plant billing. We use it to weigh trucks, generate invoices, pay our haulers and provide our customers with project and product information," explains Alan Berkey, systems analyst and programmer with Vulcan's Midwest Division, Construction Materials Group. Berkey was charged with overseeing the conversion in his Lombard, IL-based division.

Time for an IT Makeover

After 15-plus years, the division's Unisys B20 Series microcomputer had reached the end of its service life. With its proprietary BTOS operating system, one megabyte of memory and

"With Net Express, I could make old code work on new hardware. I didn't have to touch 80 or 90 percent of the code."

Alan Berkey, *Systems Analyst/Programmer, Vulcan Materials' Midwest Division*

Vulcan Materials Co., *continued*

20 megabytes of hard-disk space, the Unisys platform could not accommodate needed functionality. Replacement hardware was becoming scarce, and a change had to be made. Management's goal for the Midwest Division was to convert the COBOL-based plant billing application to run on Windows 95.

Working alone, Berkey first sat down to test the Micro Focus Net Express software from MERANT in October 1997. Within one month, his progress convinced management that the MERANT solution was the right choice. By May 1998, he had the bulk of the 175,000-line application ready to run on PCs at Vulcan's Laraway Quarry in Joliet, IL. "Since then the pilot has been chugging right along; it has been flawless," comments Berkey.

"MERANT was the most cost-effective provider when we considered rolling out the application to nearly 40 locations in our tri-state area. And, by evaluating Net Express for 30 days, I had the chance to convince management that the project could be successful."

Alan Berkey, *Systems Analyst/Programmer, Vulcan Materials' Midwest Division*

Learning a new programming language would have increased the development timeline considerably, he adds. And the chance that critical business logic could be lost in the conversion was too risky. "Using Net Express, we brought more than 15 years of business rules forward without losing a thing. In fact, we actually gained functionality with the increased memory and multi-tasking provided by running Windows 95 applications on a PC," he adds.

Vulcan and its employees already are realizing benefits from the conversion. The new billing system enables scale clerks at Vulcan quarries to record the weight of outgoing trucks and generate end-of-day shipping reports for internal and customer use. The reports tally the number of loads and tons shipped by customer, project and product type, as well as by day, month and year. The plant billing application also maintains product inventories and quality control information for management and production personnel.

Making a Smooth Transition

Ensuring a painless transition for the scale clerks who use the application all day, every day had been a goal from the outset. "Using Net Express, we converted the old code to run on Windows 95 PCs and were able to keep all the screens and keystrokes the same as they had been on the old system," Berkey reports. "It was a seamless transition for our users."

Further, the scale clerks at the quarries save about a half hour at the end of every work day. They can now quickly produce all their end-of-day reports, perform back-ups and, in WAN sites, immediately and reliably transmit their daily billing information directly over the network to the division office. With the old Unisys B20 system, equipped with a slow 80186 processor, they had to use a dial-up modem to upload end-of-day data to the division office. Closing reports and back-ups could take over 30 minutes, and the dial-up, in some instances, was less than reliable. In the PC/WAN environment, the entire process is completed in about five minutes.

An added benefit to the system is the ability to monitor project information over the WAN from the customer-service area in the division office. As a result, there are far fewer phone calls from the customer-service representatives regarding the status of projects shipping from the remote site.

Micro Focus Net Express on PCs made that time savings possible and without the necessity of writing or buying a new plant billing application for Windows 95. "With Net Express, we could take the old code and make it work on a new piece of hardware. I didn't even have to touch 80 or 90 percent of the code," says Berkey. "I found the product easy to use, and I quickly became productive in the Net Express environment."

Berkey successfully completed the roll-out in the Midwest Division in May 1999 and is now adding enhancements for network access and availability. ■

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technology and engineering institute. "It used to be that we would go to recruiting fairs and take what we could get," says Bill Fairfield, CEO of Inacom, a $4 billion computer services company that helped start the institute. "But today, we're trying to shape the students."

Fourth: Recruit more aggressively. Reach out to smaller rural communities and to women and minorities. There's a lot of talent out there just waiting to be found. Create real opportunities and career ladders for these people.

But there's something I wouldn't recommend, because it's not a long-term solution. Don't go to Washington to fight for allowing more foreign engineers and designers to enter the U.S. on temporary H-1B visas. That may help in the short term, but it doesn't deal with the underlying problem. It won't create a permanently bigger stream of IT professionals for the future.

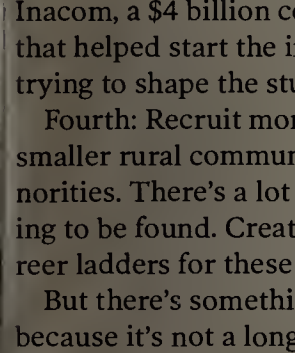
America's buoyant economy is a testament to the dynamism of its IT sector.

But for IT to stay dynamic, more Americans will have to become a part of it. ◗

DAVID MOSCHELLA

Why the Web's sleeping giants keep snoozing

ALMOST REGARDLESS of what industry you are in, few questions are more important than whether the new generation of pure dot.com companies will prove superior to their pre-Web rivals. Should we view companies with real stores and actual offices as being "physically challenged" or as sleeping giants? While the answer will almost certainly vary by industry, the challenges that companies face are actually quite similar.



DAVID MOSCHELLA is an author, independent consultant and weekly columnist for *Computerworld*. Contact him at **dmoschella@earthlink.net.**

Below are what I view as the five main reasons that businesses fail to adapt to radically new circumstances. Consider them traps to be recognized and avoided.

1. Failure to appreciate the power of new ideas. Companies significantly underestimate the potential size of a new opportunity. Minicomputer companies never saw how big the PC business would get. Worse still, they focused on the weaknesses of the early PCs rather than their long-term potential. This happens today with the Internet; corporate giants often sneer at many Web businesses because they're still so tiny and so full of obvious shortcomings.

2. Too much focus on the current business. Day-to-day competition is hectic enough without having to worry about a whole new environment. Who should Borders focus on — Barnes and Noble or Amazon? Lacking the necessary management bandwidth, many companies instinctively and understandably shy away from conducting a two-front war, often to the detriment of their online operations.

3. Not accepting the impact on the current business. Obviously, Fidelity and other financial giants could afford to match or undercut Schwab's online stock-trading prices, just as Compaq could sell primarily direct. But companies are often paralyzed by the likely impact on their employees, partners and short-term earnings. Thus, many businesses knowingly violate a basic maxim: If you don't cannibalize your business, someone else will.

4. Failure to keep and attract key people. Existing companies often find it all but impossible to match the financial incentives of their start-up rivals. Why develop software inside IBM when you might make a thousand times more income doing the same thing independently? So-called "tracking stocks" may look like funny money, but they are actually one of the few ways to deal with this problem. Don't be surprised if even Microsoft feels compelled to try it.

5. It's easier to study and debate than make hard decisions. In the end, companies often don't respond effectively because they move too slowly and too cautiously. While the pure dot.com companies have no choice but to operate according to intuition, vision and faith, many older businesses demand evidence and become inherently risk-averse. But while the skeptics debate, the believers keep moving forward. Inevitably, this leaves many pre-Web companies in a hopelessly reactive position.

Do any of these five patterns exist in your company? Nah, I didn't think so. But if you agree with this list, then you probably also agree that no matter how many companies might stumble, no one's fate is inevitable. Great leadership can overcome almost any challenge. Yet despite today's seemingly exorbitant CEO salaries, exceptional leadership is actually quite rare and, therefore, worth almost any price. ◗

READERS' LETTERS

A place in politics for the immigration visa?

WELL, it certainly looks like the GOP wants to lose another election to an eminently defeatable candidate. Is there no limit to the extent these whores to big business will grovel for campaign contributions? Now they're going to climb, willingly, into bed with the very businesses that exploit foreign workers at the expense of U.S. citizens to raise the H-1B visa limit to 200,000 per year ["GOP Eyes Boost in Foreign Workers," Page 1, Aug. 9]. That means that, over six years (the duration of the visas), there will be as many as 1.2 million additional foreigners working in this country, taking jobs from American citizens and taxpayers.

If the GOP is so stupid that they think they can ignore the electorate, even after the debacles they caused themselves in 1996 and 1998, then they truly deserve what they are going to get in 2000.

Geoff Wascher
Consultant
Utica, Mich.

I HAVE a modest proposal: the creation of an immigration visa, the H-1C. This would be used to bring in foreign workers as congressional candidates. We could pay them much less than current congressmen (and women) and get more work done! Also, we wouldn't have to pay them retirement or health benefits.

John A. Parke
Marietta, Ga.

It's a fact: Microsoft competes fairly

ALTHOUGH Michael Cusumano raised several interesting points in his recent column ["Industry Leaders Have Special Responsibilities," Aug. 2], the allegation that Microsoft "forced companies like Compaq not to promote the Netscape browser" is flatly wrong and an example of the spread of misinformation based on a wholly inaccurate claim.

As the evidence presented at the Department of Justice trial clearly showed, this claim voiced by a Microsoft rival (but not by Compaq itself) is false. Nothing in Compaq's Windows license prevented Compaq in any way from loading Netscape Navigator onto its PCs. Compaq has always had the ability to preload Netscape Navigator with the Windows operating system, as well as to feature the Navigator icon on the Windows desktop and make Navigator the default browser. In fact, Compaq preinstalls Navigator on all of its Presario PCs shipping today. If anything, the facts showed that Compaq removed the MSN and Internet Explorer icons from Compaq machines in 1996 to feature AOL, not Netscape. The whole incident really had nothing to do with Netscape.

Overall, Microsoft's actions (or nonactions, as the case may be) are consistent with an industry leader that competes aggressively in a fast-paced and intensely competitive arena. Unsubstantiated claims from competitors notwithstanding, the facts have shown that Microsoft also competes fairly.

Charles F. Rule
Covington & Burling
Washington
(The writer is a former chief of the antitrust division at the U.S. Department of Justice and currently a consultant to Microsoft.)

COMPUTERWORLD welcomes comments from its readers. Letters shouldn't exceed 200 words and should be addressed to Allan E. Alter, columns editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 875-8931; Internet: letters@computerworld.com. Include an address and phone number for immediate verification

BILL LABERIS

The $6 billion question: Has your vendor gone buyout crazy?

EARLIER THIS YEAR, Ford paid $6.4 billion for Volvo's car business. In exchange, Ford got one of the most venerable and respected names in the auto industry. It also obtained factories and assembly lines, offices and relationships with suppliers and dealers that took Volvo decades to build and nurture. Ford also got thousands of new customers worldwide for Volvo's $35,000 cars.

BILL LABERIS is a consultant in Holliston, Mass. and former editor in chief of *Computerworld*. Contact him at **bill@laberis.com.**

Late last month, Cisco Systems shelled out $6.9 billion for Cerent Corp., which posted less than $10 million in sales in the first six months of this year and whose operations, serving about 100 customers during the company's brief history, have had nothing in common with the word "profits."

The deal came a month after Cisco rival Lucent acquired International Network Services, a $300 million integration company, for $3.4 billion. That's roughly 10 times revenue, a benchmark different from the 10-times profit figure that until recently was used to guide technology company acquisitions. Cisco paid roughly 300 times revenue for Cerent.

Has the world gone nuts? Has Cisco, arguably one of the best-managed companies on Earth, taken leave of its senses? Should you be worried about some of your main suppliers?

The answers to these three questions are yes, no and maybe. Investors have given market values to start-ups, primarily Internet companies, that utterly defy logic. Then the start-ups go off half-cocked on acquisition binges they are unprepared to manage.

Cisco isn't a start-up and historically hasn't gone off doing half-cocked things. So what explains its action? What should you as a technology buyer look for in evaluating whether your suppliers are acting rationally?

First, understand that the currency of choice in acquisitions today is paper, not cash. Cisco bought Cerent with stock, and with Cisco's market value of some $225 billion, $6.9 billion isn't a lot at all. If the stock market believes at some point that Cisco is vastly overvalued, its stock price plummets. But it still owns Cerent. It's the shareholders who are out big money.

Second, you have to look closely at just what the company is buying. The biggest buyers of high-end network equipment today are the booming telecom vendors. Cerent makes gear that moves data across fiber-optic lines at phenomenal speeds and volumes, which is what the telecom vendors want. It would have taken Cisco years to develop the technology on its own, by which time rivals like Lucent may have beat them to market.

Third, look closely at a vendor's track record at assimilating acquired companies and technologies. Netscape was one of the first vendors to use found money from skyrocketing market value to go on an acquisition binge. Only it didn't work, and eventually Netscape became an acquiree.

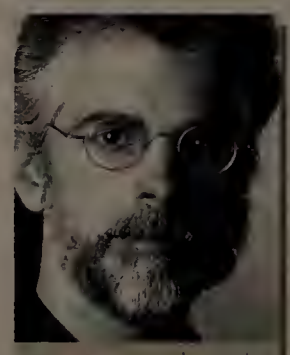
Cisco's track record is remarkable. Its 40 acquisitions spanning an eight-year period have each contributed to Cisco's amazing record of sales and profit growth, not to mention customer service. Not one clunker.

Although deals like Cisco-Cerent have elements of otherworldliness, you have to examine them from different perspectives before passing judgment, particularly when you do a lot of business with a vendor and might be wondering if it's gone off the deep end. ◗

WILLIAM ULRICH

Don't be a victim of year 2000 denial

IF THERE ARE a significant number of year 2000 failures next year, will companies report them as such or will they try to convince us that those failures aren't Y2K-related? Regardless of the volume of failures, I believe that corporate and government entities will underreport Y2K problems as the new century dawns — and this will end up hurting all of us.



WILLIAM ULRICH is president of Tactical Strategy Group Inc. and cofounder of Triaxsys Research LLP. Contact him at **tsginc@cruzio.com.**

Far-fetched? I don't think so. I've already heard of several problems that certainly appear to be caused by Y2K glitches, even though they were blamed instead on non-year 2000 causes.

On July 8, the *Omaha World-Herald* reported that "a Y2K-related computer glitch in the Nebraska State Patrol's crime database resulted in the loss of misdemeanor warrants that had been entered statewide during the past five months." A later version of the same article eliminated all references to Y2K. We can speculate on why the paper shifted its report to say that the problem was not because of the year 2000, but someone didn't want it reported as such.

A second instance of Y2K denial involved a clear case of hairsplitting. A sewage spill in the San Fernando Valley occurred during a year 2000 test. According to Linda Aparicio, spokeswoman for the public works department, it wasn't clear "whether the problem was related to the test or was coincidental." While the public works department may not have known if the problem was Y2K-related, officials left the door open on the possibility that it wasn't.

Officials and executives may deny with full knowledge or may just not know if a problem was Y2K-related. What is becoming clear, however, is that private and public-sector officials are leaning away from claiming that problems are the result of a year 2000 computer bug.

Organizations may choose to deny having a Y2K problem because they wish to create the illusion that they have the situation under control. Beyond this, however, executives have several concrete reasons to keep failures quiet: to protect supply-chain and customer relationships, to collect on insurance claims and to dodge potential litigation.

For example, if a company wants to maintain its position within a supply chain or hide weaknesses in its overall remediation strategy, it could be tempted to not disclose a year 2000 problem to a customer. If a supplier gives in to this temptation, corrupt data or other problems could ripple across multiple companies before those companies can invoke their contingency plans.

Numerous insurance companies, most of which won't cover year 2000-related failures or damages, could lose out to year 2000 denial. A year 2000 failure reported on an insurance claim as a non-Y2K failure could result in claims being paid out that should be denied. If this situation isn't contained, insurance companies — and ultimately insurance customers — will pay dearly.

Companies may also attribute Y2K problems to other causes in order to dodge future litigation. For plaintiffs with a legitimate compliant, this diversionary tactic may complicate loss recovery from data corruption, supply-chain failures, financial misappropriations and other Y2K problems. But Y2K denials will only encourage lawyers to track down a cover-up. Misinformation will lead to countersuits and elongate the litigation process. Again, we will all lose.

Organizations have a duty to be honest about their year 2000 problems — if and when they do occur. Don't extend the "all is well" campaign currently being deployed by countless industries into the year 2000. And be very aware that your suppliers, business partners, customers and government officials will likely be coloring their year 2000 messages as the story begins to unfold early next year. We all play a role in stopping the cycle of denial before it starts. ◗

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*Certain restrictions apply. **Data Communications magazine, November 1998

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BUSINESS

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U.S.-centric Web sites won't cut it in Europe. If you plan to do e-commerce on the continent, legal legwork, cultural understanding and communication in native languages are necessities. ▸ 52

INTERNET-BASED CATALOGS RISE

An Internet buying standard called OBI (Open Buying on the Internet) hasn't taken off, and some say that's because it hasn't been production-ready. It is now, and observers predict an upswing in usage. ▸ 39

YOU'VE GOT MAIL – FROM THE BANK

Given the go-ahead by the Federal Reserve, banks can now send out account statements electronically. But it will be mid-2000 before most institutions offer that service because of document complexities and the need for more customers who want the service. ▸ 39

PRODUCTIVITY PARADOX

It's still true that spending more on technology won't necessarily increase your productivity, says columnist Paul A. Strassmann. But you can reduce spending on obsolete systems and cut operating costs. ▸ 40

UPGRADES HIT PRODUCTIVITY

Of course vendors want customers to upgrade their systems all the time. But some users aren't buying it. If they swap in new systems and software too often, nobody gets any work done, says our report from Dell's DirectConnect forum. ▸ 38

BUSINESS QUICKSTUDY

What is mass customization, and why do you need to know about it? It's the tailoring of products to individual customers; it's the future; and to make it happen, information technology is key. ▸ 54

PRIVACY HEADS NORTH

U.S. law enforcers want to disable encryption for criminals. The prospect of such legislation has sent 20,000 inquiries over the border to a Canadian firm that is offering software that hides the source and destination of Internet traffic. ▸ 38

WORKSTYLES: KOZMO.COM

Working at this New York-based Internet start-up is so much fun, no one wants to leave. Quarters are tight (for now), but the work is challenging, and just about everything else is flexible. ▸ 55

MORE

Business advice 55
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Opinion: Paul Strassmann . 40

MARC BERLOW

TO GET HER TO OPEN her purse strings wide, you better have strong project and networking experience, says Katie Walker, IS manager at the Milwaukee Social Development Commission

A RETURN TO SALARY SANITY

Two years ago, information technology salaries and bonuses skyrocketed to record highs. But managers have put a stop to the madness, and they've told us for the second year in a row that they now give only 5% pay hikes to all but a select few. Who still gets the big bucks? CIOs, of course. Plus prized project managers and Web wizards.

42

Some Users Not Buying The Vendor Upgrade Line

If equipment is new all the time, people can't get any work done, manager says

BY MATT HAMBLEN

AFTER HEARING industry leaders promise faster processors and exhort his company to upgrade its PCs, servers and other gear to take advantage of the Internet, Greg Winslow was dubious.

The industry leaders "have a great vision, but I don't know if I can implement their vision yet" because of the need to protect end users and reduce support costs, said Winslow, PC manager at Rockwell International Corp.'s power systems division in Greenville, S.C.

Winslow commented after the recent Dell Computer Corp. DirectConnect forum in Austin, Texas, which featured speeches on upcoming systems innovations by Dell CEO Michael Dell, Microsoft Corp. Chairman Bill Gates, Intel Corp. CEO Craig Barrett and Cisco Systems Inc. CEO John Chambers.

One theme shared among the speakers was how information technology managers need to prepare their shops for e-commerce with more powerful servers and PCs to run richer applications. Barrett said Intel estimates that only 4% of the high-end servers needed for efficient Web sites have been sold.

Similarly, Gates promoted the upcoming Windows 2000 operating system as a means for helping companies become more competitive on the Web.

But Winslow said vendors are creating a "self-fulfilling prophecy" about the market by saying companies won't remain competitive without upgrades and by showing insufficient regard for the sometimes plodding forward movement of corporations and end users.

"I say to the vendors, 'Prove it to me first.' I want to see a certain segment of my users find new innovations easier and not harder," Winslow said.

PC users at Rockwell tend to be engineers and well-schooled professionals who are willing to try new hardware and software tools. But they also tend to want new hardware and software installed, and that causes problems for Winslow's staff later as they overfill hard drives or download viruses, reducing corporate productivity.

Indeed, many users at Dell's forum were excited by promised upgrades, and Dell even presented some of its new server customers [News, Aug. 30].

But Winslow said he often positions himself between his end users and vendors to protect users from too much technology change all at once.

That protective attitude is shared by other corporate IT managers, several of whom wondered early this year whether Pentium III processors in desktops would be necessary [News, March 22].

THE ASSOCIATED PRESS

DELL'S DirectConnect forum in Austin, Texas, featured speeches on upcoming systems innovations

Still, Dell, Gates and some industry analysts said faster PCs and servers will be necessary as the Web becomes the medium of commerce and the PC evolves with interfaces such as voice-recognition software.

Gates said he's aware that corporations have wondered why they will need upgrades but added that it reminded him of when the PC arrived during the 1980s.

"When the PC came along, people said, 'Who needs it?' " Gates said.

Users Clamor for Canadian Firm's Secure Tool

Threat of U.S. legislation prompts rush on encryption

BY ANN HARRISON

A Canadian company that is developing online privacy software was deluged recently by 20,000 inquiries from Americans seeking to secure their computers against a proposed government surveillance system.

The U.S. Department of Justice recently drafted the proposed Cyberspace Electronic Security Act, which would allow law enforcement agents with court warrants to enter the home or office of a suspect and install software or devices that defeat encryption systems. Keyboard drivers could be altered, for instance, to access passwords.

Investigators are seeking this power to counter the growing use of encryption, which they said is being used to hide criminal activity.

David L. Sobel, general counsel at the Electronic Privacy Information Center in Washington, said such government break-ins are rare under existing surveillance laws, and extending this power would make break-ins far more common.

Freedom for All

Privacy concerns have been a boon to Montreal-based Zero-Knowledge Systems Inc. (*www.zeroknowledge.com*), which said the draft legislation prompted more than 20,000 requests from U.S. citizens and businesses to beta-test the company's Freedom software. The U.S. government "Completely misjudged people's concerns about privacy," said Austin Hill, president of Zero-Knowledge.

The Freedom software encrypts the contents of any Internet transmission, including that of e-mail, chat rooms, Web browsing and newsgroups, with high-grade public-key cryptography.

It also hides the source and destination of all Internet traffic — which could be important under a surveillance system that searches the Internet for possible suspects.

Pretty Good Privacy "does a great job of providing digital signatures and encrypting content," said Hill of the popular encryption system. "But everyone knows that Austin Hill sent out an encrypted message, so [investigators can] go to his house and see what he is saying."

Hill noted that companies are also interested in using the Freedom software to confidentially browse their competitor's Web sites.

Other corporate uses include masking heavy e-mail traffic to a potential acquisition or concealing the identity of employees on a mailing list that may be scanned by headhunters.

Release of the Freedom Beta 3 is scheduled for today, and a full commercial release is expected in November.

MOREONLINE

For resources related to encryption policies, such as FAQs, organizations and papers, visit our Web site.

www.computerworld.com/more

SNAPSHOT

Web Business Fast Facts

- **Service companies sell more on the Internet than product companies – 15.1% vs. 6.3% of annual revenue**
- **64% of America's fastest-growing companies are selling online**
- **7.6% of Internet-based sales are from international business**

Base: Survey of 350 public and privately held high-tech companies

SOURCE PRICEWATERHOUSECOOPERS NEW YORK

Backers Hope OBI Upgrade Will Spur Usage, Finally

But sellers must wait for buyers to obtain technology

BY CAROL SLIWA

Open Buying on the Internet (OBI) has been slow to catch on, but backers hope a recently released upgrade will spur more companies to use the business-to-business purchasing standard that can help automate high-volume, low-dollar transactions.

OBI consortium members include such large companies as Ford Motor Co., American Express Co. and Office Depot Inc. But so far, they have used the OBI set of technology standards and business processes primarily in pilot situations, a consortium official said.

"The momentum's been slow to build. There's no doubt about that," said Weyman Watson, manager of e-commerce consulting services at Murray Hill, N.J.-based BOC Gases Inc., an OBI consortium member. "A lot of people took a wait-and-see attitude. They participated in the consortium, but they didn't go home and do the work.

"They were sitting on the fence to see if it was really going to work, waiting for somebody else to get the bugs out of it," Watson added.

The newly enhanced Version 2.0 (see chart) is the first release that's considered suitable for production use, according to Randy Whiting, president and CEO of CommerceNet Inc., a nonprofit organization that is responsible for managing the OBI effort.

"We've got some commitments from a number of companies that plan to do real production implementations of OBI by the end of the year," Whiting said.

BOC, an early adopter, currently sells gases to two customers, Ford and MIT, via OBI transactions. Another three are involved in test projects, and several others have expressed interest.

The main advantage for a seller such as BOC is that it has to maintain only one style of electronic shopping catalog that all of its customers will be able to access, rather than having to "service all the disparate commercial catalog products that are out there," Watson said.

"OBI allows us to build one Web site that we can scale across multiple trading partners," agreed Barry Carney, vice president of e-commerce at VWR Scientific Products Corp. in West Chester, Pa.

But selling organizations such as VWR and BOC often have to wait for buyers to get the necessary technology to do OBI transactions.

OBI consortium member BASF Corp., for instance, held off implementing OBI because of more pressing Y2K and enterprise resource planning system work. Now the company is evaluating OBI-compliant software packages that it can use for Internet-based procurement — including one from its enterprise resource planning vendor, SAP AG.

Open Buying on the Internet, Version 2

Enhancements include:

MORE DETAILED EXPLANATIONS of how to adhere to the specification. For example, OBI Version 1.1 didn't provide a list of error codes that identify why transactions failed. Version 2 contains a lengthy list of response codes for handling errors, based on member testing.

Y2K-COMPLIANT transaction sets.

A MORE AMPLE item field so that companies can enter more descriptive information about orders.

SUPPORT FOR OBI transactions interacting with supplier-side electronic catalogs.

"OBI's not the problem. The problem is choosing the right system that integrates with our ERP system. We have to do a [return on investment evaluation] and determine the best situation for our company," said David Rice, manager of supply support programs at the Mount Olive, N.J.-based manufacturer of chemicals, pharmaceuticals, plastics and fibers.

Giga Information Group Inc. analyst Erica Rugullies said Extensible Markup Language (XML) has "generated significantly more interest [than OBI] on the part of vendors in the last six months."

"The powerful vendors are going to push adoption of standards, and they're not pushing OBI," Rugullies said.

But XML support is in the current work plans of the OBI consortium, said Dave Hollander, a CommerceNet director.

Despite Go-Ahead, Banks Don't Rush E-Statements

Issues to be resolved include fine print, volume needed to make investment pay off

BY DOMINIQUE DECKMYN

THOUGH BANKS are applauding the Federal Reserve's move to allow electronic delivery of account statements, plans to offer such services aren't likely to materialize until the second quarter of next year.

The Fed issued the rule last month, together with a set of proposals that would allow banks to electronically deliver a wider range of financial disclosures.

Nessa Feddis, senior federal counsel for the American Bankers Association in Washington, said the Fed's proposals are "very promising." But Feddis added that many banks are hesitant to implement them because not enough consumers are expected to sign up for such services to justify the upfront costs of implementing them.

Various practical considerations are also holding banks back, said Bill Bradway, an analyst at Meridien Research Inc. in Newton, Mass. For instance, the electronic statements should resemble the fine print and graphics people are used to on paper but at the same time be easily readable on-screen and printable on a low-quality consumer printer.

Another issue is that consumers change e-mail addresses far more often than they change postal addresses, causing additional administration costs.

Wells Fargo & Co. in San Francisco will offer its customers the option of viewing their statements online by the end of the second quarter next year, said Sharon Osberg, executive vice president and head of online financial services at the bank. She said the service will be added to the company's current online banking site.

Green Light

The Federal Reserve is letting banks go forward with posting statements electronically

- Interim rule lets banks send periodic statements electronically
- Proposal would widen the principle to other banking disclosures
- Disclosures can be sent by e-mail or posted on a bank's Web site
- Consumer must agree to electronic disclosures and must possess sufficient hardware and software

Going Half-Electronic

Most banks appear to be leaning toward posting disclosures on their Web sites and sending consumers notification by mail rather than sending sensitive information by e-mail.

First Union Corp. in Charlotte, N.C., said it is developing software that will allow it to send electronic statements "at some time in 2000." The company said it would probably use some of the same technology being developed for Spectrum (formerly named The Exchange), the online bill presentment service to be launched later this year by First Union, Wells Fargo and The Chase Manhattan Corp.

"This is not going to be a money-saver for banks in the next few years," said Brook Newcomb, an analyst at Forrester Research Inc. in Cambridge, Mass.

Only about 4% of households are currently involved in online banking or online investing, said Newcomb. So only the largest banks could expect significant savings on their mailing costs to offset development costs.

Newcomb said that other industries, and notably utilities, are moving faster, partly because their documents are simpler than account statements.

"Probably 80% of utilities are planning to do [electronic bill presentment] within the next 18 months," said Newcomb.

MOREONLINE

For resources related to banks and e-mail visit our Web site.
www.computerworld.com/more

BRIEFS

Online Broker Expands Into U.K.

U.S.-based online broker DLJ Direct Inc. last week launched a U.K. version of its Web-based stock trading service. The Web site will initially allow trading only in U.K. shares, but beginning next month, DLJ Direct plans to offer U.S. stocks as well.

DLJ Direct is the online branch of brokerage firm Donaldson, Lufkin & Jenrette Inc. in New York.

Japanese Insurer, IBM in $235M Deal

Tokyo-based insurance company Mitsui Marine and Fire Insurance Co. has outsourced its host systems operation and management to IBM in a $235 million, 10-year deal that began Aug. 1.

Mitsui and IBM officials said this is the largest outsourcing contract in dollar terms to date in the Japanese insurance industry.

Cable & Wireless Buys Compaq PCs

Cable & Wireless PLC has signed a global IT agreement with Compaq Computer Corp. for Compaq's Deskpro desktop PCs and Armada notebook PCs for the telecommunications giant's global operation. The contract is worth $75 million over the next three years.

Travel Agency Picks Dell

Carlson Wagonlit Travel has chosen Dell Computer Corp.'s OptiPlex PCs as the desktop standard for its Associate Division's franchise network. Carlson Wagonlit has about 700 associates. The travel agency also uses Dell's Premier Pages service, which provides customized, password-protected Web sites.

Online Travel Bookings Increase

Travel site Uniglobe.com reported $22.35 million in bookings for the second quarter, ended June 30. That figure is up 244% from gross travel bookings of $6.5 million in the first quarter of this year and up from $1.02 million in the second quarter of 1998.

Uniglobe.com officials credit the company's strong growth to its new relationship with Yahoo Inc. as its featured cruise retailer and to new bookings from its relationship with InHouse Travel Group.

SNAPSHOT

IT Leaders' Opinions on Y2K

1. ARE YOU PERSONALLY PREPARING FOR YEAR 2000?	
No, Y2K is overrated	50%
Yes, will prepare	50%

2: WHAT PREPARATIONS ARE YOU MAKING? (ASKED OF THOSE MAKING PREPARATIONS)	
Plan to keep cash on hand	93%
Plan to stock up on food and water	52%
Plan to stock up on fuel	25%
Plan to sell my tech stocks	7%
Other	10%

Base: Survey of 303 IT professionals at companies with 1,000 or more employees worldwide

SOURCE: INTELIQUEST, AUSTIN, TEXAS

PAUL A. STRASSMANN

Paradox revisited

THERE ARE fabulously profitable firms with low per-capita spending on computerization. Likewise, there are dismally unprofitable firms with high per-capita spending on computerization. Why? Since 1985, I have published five books dealing with the "computer paradox," which states that there is no evidence that greater spending on computers will necessarily boost a firm's productivity. With one exception, nobody has quarreled with the data itself.

Nevertheless, the critics found it difficult to swallow the observations that the paradox persists. Their experiences told them otherwise. Computers were wonderful, and most of us couldn't function without them.

Recently, I received a message from one of the most respected computer scientists, now a retired CEO who frequently speaks at industry events. He wrote, "I refuse to believe that my former customers and my current audiences are fools and idiots. I wonder if IT investments correlate with something other than profits — or something you are missing."

I don't believe that I am missing any facts. Since 1982, I have tried to find correlations with IT spending, including every conceivable variable such as revenue, assets, stock market prices and shareholder equity. So far, I can't report success, and nobody else (to my best knowledge) has found a positive relationship. Thus, the paradox remains a phenomenon, though it is also true that computers enable people to work faster, smarter and in ways that were never feasible before.

The computer paradox is here to stay.

After looking at all the evidence, I have concluded that the computer paradox is here to stay. The best we can do is understand why.

The root cause of the computer paradox lies in the uses of computerization as the weapon of choice in economic competition. The costs and effectiveness of information management, not the possession of physical capital, have become decisive in separating the winners from the losers. In these contests, everyone is buying comparable technologies, without economic justification.

The economic model is one of an arms race, where all parties must escalate their information competitiveness, thus largely nullifying one another. That results in winners as well as losers, as is the case in all warfare. It is the random distribution of profitability of both the winners and the losers, when plotted against estimated IT spending, that leads to the random pattern of no correlation between IT spending and corporate profits.

The progress in IT has exacerbated this randomness by making it possible to change the rules of economic warfare at an accelerating rate. The history of warfare offers lessons in why and how this can happen. The English archers defeated the French knights in armor. The German blitzkrieg bypassed France's Maginot Line. The prospects of "Star Wars" made masses of Soviet tanks and artillery irrelevant. In each of these cases, wealth-draining investments in military assets turned out to be liabilities as resources were wasted and abandoned. The defenders couldn't buy their way out of defeat by spending more money on what were the sources of their fundamental economic failures to begin with.

What is different now is that in the Information Age, winners can be dislodged in less than two typical technology cycles, or less than 14 years. That wasn't the case in the Industrial Age, when the rise and fall of corporations took much longer because large capital investments and entrenched economic positions favored the established firms.

The uncritical assumption that just pouring more money into computer budgets will make it possible to keep up with an increasingly costly technology race is a prescription for failure. While the computer paradox persists, the best way of winning is to avoid overspending on obsolescent systems and to reduce operating costs. This makes more money available for innovation and rapid adaptation as the rules of economic warfare evolve. ◗

Strassmann (paul@strassmann.com) recommends that IT executives learn more about guerrilla tactics where underresourced, but innovative strategies may still lead to victory.

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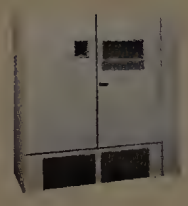

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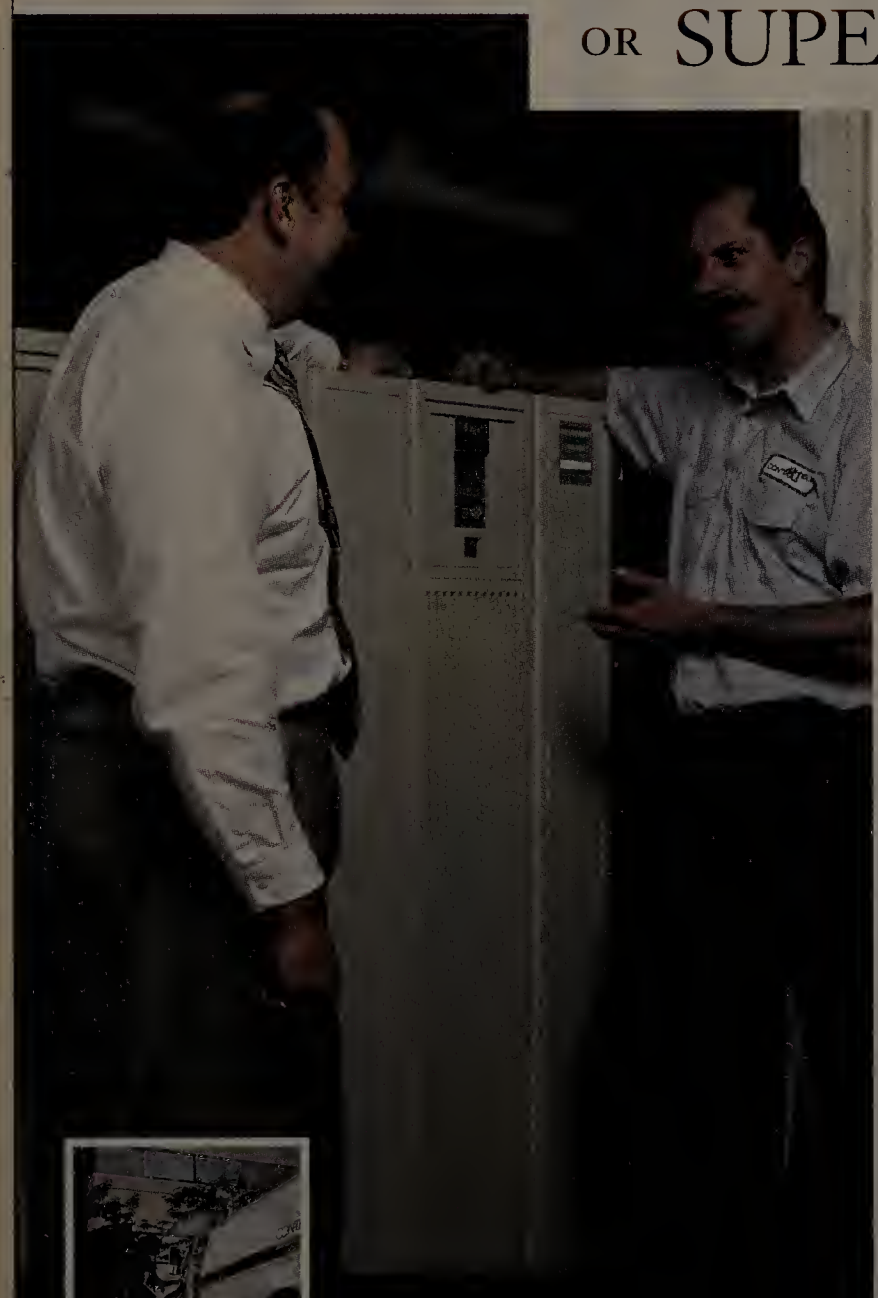

Liebert Representative Jeff Price of CDP, Inc. (left), and Jim Vivian of Johnson Controls worked together to configure a protection system for Johnson Controls' IT network. Because of the network's size, they specified a Liebert UPStation® S3, an on-line, three-phase UPS for handling larger systems.

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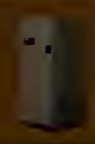
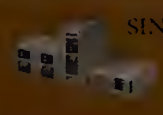


PRECISION ENVIRONMENTAL CONTROL



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COMPUTERWORLD'S 13TH ANNUAL

Return To Sanity

Two years after IT salaries and bonuses skyrocketed to record highs, managers report again they have put a stop to the madness, giving 'traditional' increases to all but a prized few

By Bronwyn Fryer

HISTORY repeats itself — even in an industry that measures time in gnat-like Internet years. Once again, IT managers are finding themselves in the midst of a four-year boom-and-bust salary cycle.

According to *Computerworld*'s 13th Annual Salary Survey, conducted in June and July, big pay increases are proving to be the exception rather than the rule. The typical increase in information technology salaries has hovered between 4% and 5% for the second year in a row. Indeed, salaries for all but a few IT positions in 1998 and 1999 have remained remarkably flat. This is far below the big overall increase of 11% in 1997, and it puts most IT professionals in the same cost-of-living increase camp as people in other occupations.

Surprised? Don't be. Despite the continuing talk of a technology skills crunch, companies say they have generally cut down on fat paychecks. The latest findings confirm a trend that *Computerworld* has been seeing over the past 13 years — ever since it has been conducting the annual survey.

Approximately every four years, IT salaries rise significantly in one year as the market adjusts to hiring demands, and then they immediately flatten out to "traditional" cost-of-living increases for the next three years. If the pattern holds true, salaries won't likely spike again until 2001.

The current lull is a relief to Michael Hoffman, who heads a staff of 25 technology professionals at Big 5 Sporting Goods, a retail chain with headquarters deep in the smoggy heart of greater Los Angeles.

"Salaries were going crazy before," Hoffman says. "We were starting to be leery of people who were jumping around from job to job chasing bigger salaries."

Hiring From Inside – Again

Hoffman says he thinks the settling of salaries is partially related to the increasing availability of people who've finished up their work preparing for the millennium. "I'm getting a lot of calls from people who are becoming available as their Y2K projects end," he says.

But as was case in the 1998 survey, employers are also increasing the supply of technologists by providing technical training to existing employees. There are benefits to internal recruiting and retraining, survey respondents say. Trainees already know the business; they may have the communication skills that IT departments increasingly need; and they cost less than "paying consultants a million bucks an hour," Hoffman says.

For its part, Big 5 decided to train cashiers and others to handle technical jobs. "You can take a technical person and teach them the business, but you can also take a business person and teach them the technical side. It's not as easy, but it works," Hoffman says.

SALARY SURVEY

Other survey respondents say they agree. "Technical skills can usually be learned," says James Stewart, group vice president at Duff & Phelps Credit Rating Co. in Chicago. "But it's hard to find those candidates that can be great coders and great communicators [at the same time]."

Nevertheless, companies are looking high and low for webmasters, department heads and highly skilled project managers — all of whom continue to be in high demand. "The salaries for people whose skills deal with the Internet are certainly going up the fastest," Hoffman observes.

The survey bears out Hoffman's point. Companies in Los Angeles and elsewhere are choosing to pay top dollar for just about anyone with Internet-related skills. The typical increase in salaries for webmasters jumped 11% from a national average of $47,000 in 1998 to $53,000 in 1999.

In Big 5's home of El Segundo — a place where local heavies Xerox Corp., Hughes Aircraft Co. and Computer Sciences Corp. rely heavily on technology — the community's home page (*www.elsegundo.org*) says it all: El Segundo, the home page boasts, is "perhaps the only small town where Java is the second language."

Who Gets What

At Chicago-based Duff & Phelps, as elsewhere around the U.S., IT salary growth has generally remained in the 5% range. And as was the case in 1998, companies like Duff & Phelps have offset skinnier annual raises by offering bonuses, perks and nonsalary compensation to retain competent staff. Duff & Phelps offers sign-on bonuses for hot candidates, as well as 5% to 10% performance bonuses, group outings, lunches and trips to out-of-town conferences.

Still, technologists with strong business skills can go for the brass ring. Especially valued: those with Web skills and those with "the vision to make the technology work for the business, particularly those who are able to manage multiple projects at once," Stewart says.

Project managers and others who can grapple with the big business picture are among those who came out on top in the survey. IT professionals who can claim experience in managing large systems projects received fatter paychecks: Average salaries for project managers jumped roughly 12%, from $67,000 to $76,000.

Kathie Walker, information systems manager at Milwaukee's 350-employee Social Development Commission and a 17-year IT veteran of Miller Brewing Co., took advantage of a brewery buyout offer to dedicate herself to helping others. She advises people who want top-dollar to get plenty of work experience in project management, "particularly in networking, standardizing of software or hardware in multiple platforms and operating systems."

Generally, big thinkers — particularly executives responsible for driving their companies' IT vision — have been handsomely rewarded this year: The average CIO salary jumped a whopping 20% or more, typically from $116,000 to $140,000. IT directors, too, received an 11% boost in pay.

Everything Is Negotiable

But don't think that 5% salary increases for the rest of the IT world are written in stone. Nancy Bauschinger, an MIS director at a small San Francisco Bay area insurance company, suggests that job-seekers show potential employers just how much it would cost them to have their systems down. "That cost will usually be far more than the salary [one is] asking," she says.

Others agree. "The requested salary becomes affordable if you take into account the economic value-added of the person's productivity contribution," as opposed to not having that person on staff, says Frank Johnson, information systems director at United Ad Label, a manufacturing firm in Irvine, Calif. "You might have to work with your [human resources] staff to offer the right combination of salaries, sign-on bonus-

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Salary Trends We're Seeing

How the IT skills shortage is impacting select industries and job titles

LARGEST SALARY INCREASES – The largest average salary increases were reported in IT consulting (9.4%), IT outsourcing (8.5%), construction (8.7%), computer hardware (7.7%) and media services (7.4%).

HIGHEST STARTING SALARIES – Reporting the highest starting salaries for entry-level programmers, tech support professionals and help desk personnel are the pharmaceutical, IT consulting, utility, telecommunications and defense industries.

RISING SIGNING BONUSES – Especially hard-to-fill jobs get large sign-on bonuses to sweeten the pot. Topping the list is webmaster at $10,000, followed by network analysts at $8,000 and systems anaylsts at $6,700.

RECRUITING A COSTLY BUSINESS – IT managers report the following recruiting impacts: 56% paying slightly higher salaries; 15% paying much higher salaries; 5% paying larger bonuses; 24% have reduced their number of hires.

ROBERT HOLMYREN

> [The cost of having a system down] will usually be far more than the salary [an IT professional is] asking.
>
> NANCY BAUSCHINGER, MIS DIRECTOR AT A SMALL SAN FRANCISCO BAY AREA INSURANCE COMPANY

Continued from page 43
es and profit-sharing structures."

Survey respondents also agree that everything is negotiable if one has the right market niche or combination of skills. The area in which a job is located influences the bargaining process: In the priciest areas of the country, such as New York or the San Francisco Bay area, job-seekers can claim that they need higher salaries than the national average.

Will Miller, a network administrator and systems consultant in Berkeley, Calif., stumped for $15,000 more than the $50,000 his new company, a systems integrator based in the less-expensive Los Angeles area, had offered.

"I said, 'You have to understand anyone in the Bay area will be paid a lot more money for this job than you're offering,'" Miller says. The company threw in an additional $10,000. When he completes his Microsoft Certified Engineer certification in a few months, the company will boost his salary to $65,000, putting him well above the $53,750 average for San Francisco-area network administrators.

The Good Life, and Vice Versa

But salaries aren't always dictated by location. Brammer Engineering Inc., a petroleum industry consulting company in Shreveport, La., pays handsomely in an area where the average price of a nice three-bedroom home is around $150,000. At Brammer, senior systems analysts receive a base salary of $60,000, plus $8,000 in additional compensation.

Even so, the company's average raise has hovered around 5% because "the owners prefer to reward the employees with an annual bonus distribution in December rather than annual merit increases," says Charles Rodman, director of information systems. "There are always a few exceptions to this rule, however," for the very best employees, he adds.

And if you find yourself in a high-cost area with an underappreciated or lower-paying set of skills (in end-user support, for example) or in the wrong industry, watch out, says Bauschinger.

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> [People who want top-dollar need project management experience] particularly in networking, standardizing of software or hardware in multiple platforms and operating systems.
>
> KATHIE WALKER, IS MANAGER, MILWAUKEE SOCIAL DEVELOPMENT COMMISSION

MARC BERLOW

Location, Location, Location*

Total compensation (salaries plus bonuses) by geographic region

JOB TITLE	NATIONAL AVERAGE	NEW ENGLAND	MIDDLE ATLANTIC	EAST-NORTH CENTRAL	WEST-NORTH CENTRAL	SOUTH ATLANTIC	EAST-SOUTH CENTRAL	WEST-SOUTH CENTRAL	MOUNTAIN	PACIFIC
CIO/VP of IS/IT	$140,325	$131,659	$201,278	$128,790	$88,750	$117,306	$122,844	$109,079	$126,353	$144,519
Director of Networks	$83,675	$80,150	$103,764	$83,102	$64,042	$71,457	$66,300	$73,300	$80,833	$82,524
Network Admin./Analyst	$53,156	$53,768	$56,524	$53,704	$51,125	$50,267	$48,593	$45,639	$55,043	$55,978
LAN Manager	$57,299	$56,200	$62,754	$60,574	$52,469	$51,935	$50,156	$44,636	$61,364	$61,167
Sr. Programmer/Analyst	$59,390	$60,750	$60,169	$60,288	$56,154	$54,024	$50,346	$51,208	$58,077	$71,342
Programmer/Analyst	$48,892	$49,348	$51,742	$48,911	$45,741	$45,791	$44,694	$47,000	$48,971	$55,243
Webmaster/Web Designer	$53,149	$43,808	$58,607	$53,750	$50,917	$48,572	$46,000	$49,938	$55,292	$59,600
Lead Computer Operator	$39,218	$47,794	$44,260	$40,344	$31,059	$34,521	$31,450	$30,600	$35,682	$40,217
PC Tech. Support Specialist	$37,718	$38,423	$40,131	$38,243	$35,563	$33,681	$35,405	$34,974	$38,000	$41,545

* REGIONS ARE AS FOLLOWS: NEW ENGLAND = MAINE, VERMONT, NEW HAMPSHIRE, MASSACHUSETTS, CONNECTICUT, RHODE ISLAND; MIDDLE ATLANTIC = NEW YORK, NEW JERSEY, PENNSYLVANIA; SOUTH ATLANTIC = DELAWARE, DISTRICT OF COLUMBIA, MARYLAND, VIRGINIA, WEST VIRGINIA, NORTH CAROLINA, SOUTH CAROLINA, GEORGIA, FLORIDA, PUERTO RICO, U.S. VIRGIN ISLANDS; EAST NORTH CENTRAL = WISCONSIN, MICHIGAN, ILLINOIS, INDIANA, OHIO; EAST-SOUTH CENTRAL = KENTUCKY, TENNESSEE, MISSISSIPPI, ALABAMA; WEST-NORTH CENTRAL = NORTH DAKOTA, SOUTH DAKOTA, MINNESOTA, NEBRASKA, IOWA, KANSAS, MISSOURI; WEST-SOUTH CENTRAL = OKLAHOMA, ARKANSAS, LOUISIANA, TEXAS; MOUNTAIN = IDAHO, MONTANA, WYOMING, NEVADA, UTAH, COLORADO, ARIZONA, NEW MEXICO; PACIFIC = ALASKA, WASHINGTON, OREGON, CALIFORNIA, HAWAII, GUAM

JOB TITLES AND DESCRIPTIONS SURVEYED

TOP IT MANAGEMENT

- **CIO/Vice President of IS/IT**
  Top IS/IT executive for the organization, enterprisewide
- **Director of IS/IT**
  Top IS/IT executive for a business unit or division
- **Director, Systems Development**
  Directs systems management and applications programming
- **Director of IS/IT Operations**
  Top executive of data center and systems operations group
- **Director of Networks**
  Top networking executive, managers voice and data communications

NETWORKS

- **Manager of Voice and Data Communications**
  Manages voice and data communications
- **LAN Manager**
  Responsible for planning, designing and operating the LAN
- **Communications Specialist**
  Provides technical expertise for voice and data communications
- **Network Administrator/Analyst**
  Administers, defines, updates and maintains networks

SYSTEM DEVELOPMENT AND INTEGRATION

- **Project Manager, Systems and Programming**
  Defines project system requirements and procedures
- **Manager Internet/Intranet Technology**
  Manages all Internet or intranet development and operations
- **Database Manager**
  Directs database design, programming and maintenance
- **Project Leader**
  Organizes and monitors project personnel and resources
- **Senior Systems Analyst**
  Designs advanced system requirements to solve business problems
- **Database Analyst**
  Develops both physical and logical database functions
- **Systems Analyst/Administrator**
  Analyzes business processes and designs basic system requirements
- **Senior Systems Programmer**
  Responsible for system software, operations and integration
- **Senior Programmer/Analyst**
  Develops, tests and maintains advanced application programs
- **Webmaster/Web Designer**
  Responsible for Web development and maintenance
- **Systems Programmer**
  Performs basic system programmer tasks
- **Programmer/Analyst**
  Develops, tests and maintains basic application programs

TECHNICAL SERVICE AND OPERATIONS

- **Computer Operations/DP Manager**
  Manages computer systems and data processing groups
- **Computer Operations Supervisor**
  Direct supervisor of computer operators
- **Technical Specialist**
  Provides technical support and monitors processing efficiencies
- **Lead Computer Operator**
  Responsible for scheduling, processing and distributing information
- **Computer Operator**
  Responsible for daily processing and backing-up of information

PC END-USER SUPPORT

- **Micro Manager/Computing Manager**
  Responsible for company's PCs and compatibility with corporate strategies
- **Technology Support/Help Desk Manager**
  Manages end-user hardware and/or software support
- **PC Technology Support Specialist**
  Responsible for overall maintenance of PCs
- **Help Desk Operator**
  Answers user support questions

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BUSINESS SPECIAL REPORT

13TH ANNUAL SALARY SURVEY

TOP IS/IT MANAGEMENT

CIO/ VP of IS/ IT	Director IS/ MIS	Director, Sys. Development	Director of Networks	Director, IS/IT Operations
Average Salary: $113,478	Average Salary: $82,294	Average Salary: $87,628	Average Salary: $75,717	Average Salary: $76,737
Bonus: $26,847	Bonus: $11,131	Bonus: $10,694	Bonus: $7,958	Bonus: $10,288
Total: $140,325	Total: $93,425	Total: $98,322	Total: $83,675	Total: $87,025

NETWORKS

Manager of Voice and Data Comm.	Communications Specialist	Network Admin./Analyst	LAN Manager
Average Salary: $64,949	Average Salary: $54,246	Average Salary: $50,385	Average Salary: $54,295
Bonus: $5,556	Bonus: $3,253	Bonus: $2,771	Bonus: $3,004
Total: $70,505	Total: $57,499	Total: $53,156	Total: $57,299

SYS. DEV. & INTEGRATION

Project Mgr., Sys. & Programming
Average Salary: $70,179
Bonus: $5,904
Total: $76,083

TOTAL COMPENSATION BY INDUSTRY NONMANUFACTURING

Media	$219,600	Fin. Orgs.	$160,000	Fin. Orgs.	$146,694	Fin. Orgs.	$131,500	Media	$134,375	Fin. Orgs.	$91,609	Media	$80,500	Bus. Service, IT	$66,100	Media	$70,436	Telecomm.	$93,333
Bus. Service, IT	$208,250	Bus. Service, Cons. & Sys. Int.	$126,607	Telecomm.	$141,500	Media	$115,000	Fin. Orgs.	$121,174	Bus. Service, Cons. & Sys. Int.	$69,714	Bus. Service, Cons. & Sys. Int.	$71,864	Fin. Orgs.	$65,639	Insurance	$69,227	Bus. Service, Cons. & Sys. Int.	$91,833
Fin. Orgs.	$192,643	Bus. Service, IT	$120,500	Bus. Service, Cons. & Sys. Int.	$125,944	Bus. Service, Cons. & Sys. Int.	$106,750	Telecomm.	$117,000	Telecomm.	$86,875	Fin. Orgs.	$71,472	Bus. Service, Cons. & Sys. Int.	$62,667	Fin. Orgs.	$68,109	Construction	$90,000
Insurance	$170,666	Telecomm.	$114,167	Insurance	$116,462	Retail	$105,375	Insurance	$103,143	Insurance	$86,278	Construction	$65,000	Media	$60,250	Bus. Service, Cons. & Sys. Int.	$66,050	Fin. Orgs.	$89,532
Bus. Service, Cons. & Sys. Int.	$156,321	Insurance	$106,900	Media	$112,667	Bus. Service, IT	$99,000	Bus. Service, Cons. & Sys. Int.	$99,000	Bus. Service, IT	$77,500	Bus. Service, IT	$64,000	Construction	$56,000	Other	$64,333	Media	$88,625
Telecomm.	$142,667	Retail	$99,056	Bus. Service, IT	$106,625	Telecomm.	$96,667	Construction	$95,000	Transportation	$76,000	Telecomm.	$61,000	Insurance	$55,500	Telecomm.	$58,875	Insurance	$83,786
Retail	$141,300	Media	$96,227	Construction	$100,000	Insurance	$97,162	Bus. Service, IT	$94,000	Media	$75,200	Insurance	$59,714	Telecomm.	$54,450	Transportation	$58,375	Bus. Service, IT	$80,083
Health Care	$137,970	Utilities	$91,625	Transportation	$97,333	Construction	$95,000	Health Care	$62,533	Construction	$75,000	Utilities	$59,500	Other	$53,200	Retail	$56,250	Retail	$76,563
Utilities	$129,333	Transportation	$88,750	Retail	$95,214	Health Care	$82,313	Retail	$80,600	Utilities	$72,250	Retail	$58,000	Government	$52,555	Utilities	$56,000	Utilities	$74,833
Transportation	$122,375	Construction	$67,900	Utilities	$94,917	Utilities	$79,400	Utilities	$79,200	Retail	$66,333	Transportation	$55,625	Utilities	$52,438	Health Care	$57,344	Health Care	$74,558
Cnst.	$114,000	Bus. Service, Non-IT	$84,700	Health Care	$87,500	Transportation	$75,000	Transportation	$73,400	Bus. Service, Non-IT	$66,750	Government	$54,052	Whlsl./Dist.	$52,115	Bus. Service, IT	$56,000	Transportation	$73,750
Bus. Service, Non-IT	$111,500	Health Care	$61,742	Whlsl./Dist.	$82,063	Bus. Service, Non-IT	$74,143	Government	$73,306	Health Care	$66,429	Health Care	$51,663	Transportation	$51,955	Government	$54,367	Bus. Service, Non-IT	$70,250
Whlsl./Dist.	$106,955	Other	$76,657	Bus. Service, Non-IT	$60,286	Government	$72,686	Bus. Service, Non-IT	$71,429	Government	$59,963	Whlsl./Dist.	$51,250	Retail	$51,800	Bus. Service, Non-IT	$52,950	Whlsl./Dist.	$63,611

TOTAL COMPENSATION BY INDUSTRY MANUFACTURING

Petroleum Prod./Explor.	$220,500	Petroleum Prod./Explor.	$147,333	Petroleum Prod./Explor.	$153,500	Petroleum Prod./Explor.	$153,500	Petroleum Prod./Explor.	$153,500	Petroleum Prod./Explor.	$109,500	Electronics	$60,000	Aerospace/ Defense	$89,500	Pharmaceutical	$78,400	Computer HW/ SW/Periph.	$108,500
Electronics	$165,200	Pharmaceutical	$145,250	Computer HW/ SW/Periph.	$116,400	Consumer Products	$104,250	Food/Bev./ Tobacco	$126,000	Electronics	$90,000	Pharmaceutical	$80,000	Petroleum Prod./Explor.	$89,250	Petroleum Prod./Explor.	$74,750	Petroleum Prod./Explor.	$96,500
Food/Bev./ Tobacco	$167,143	Food/Bev./ Tobacco	$120,000	Food/Bev./ Tobacco	$118,000	Aerospace/ Delense	$63,400	Pharmaceutical	$117,500	Consumer Products	$85,200	Petroleum Prod./Explor.	$76,750	Pharmaceutical	$69,250	Aerospace/ Defense	$74,200	Pharmaceutical	$90,750
Consumer Products	$150,600	Chemical	$113,563	Consumer Products	$112,000	Chemical	$79,250	Electronics	$106,250	Chemical	$60,000	Aerospace/ Delense	$66,250	Consumer Products	$58,563	Electronics	$71,000	Consumer Products	$86,000
Aerospace/ Delense	$146,750	Consumer Products	$110,166	Pharmaceutical	$105,500	Electronics	$75,000	Consumer Products	$103,333	Aerospace/ Delense	$75,167	Food/Bev./ Tobacco	$65,875	Electronics	$58,091	Automotive	$70,000	Chemical	$82,167
Pharmaceutical	$145,500	Aerospace/ Delense	$106,600	Aerospace/ Defense	$102,667	Pharmaceutical	$75,000	Aerospace/ Defense	$99,600	Food/Bev./ Tobacco	$75,125	Automotive	$65,000	Automotive	$54,633	Food/Bev./ Tobacco	$65,600	Automotive	$79,000
Chemical	$141,500	Electronics	$105,600	Electronics	$97,143	Metal/Plastic/ Rubber/Glass	$71,936	Chemical	$97,500	Pharmaceutical	$75,000	Chemical	$60,000	Food/Bev./ Tobacco	$54,286	Consumer Products	$64,667	Aerospace/ Delense	$75,200
Computer HW/ SW/Periph.	$135,417	Apparel/Textile	$99,667	Chemical	$93,333	Food/Bev./ Tobacco	$67,500	Metal/Plastic/ Rubber/Glass	$81,600	Automotive	$74,000	Metal/Plastic/ Rubber/Glass	$59,167	Metal/Plastic/ Rubber/Glass	$51,281	Wood/Paper	$53,750	Apparel/Textile	$75,000

TOTAL COMPENSATION BY COMPANY SIZE (COMPANIES RANKED BY REVENUE)

Less than $100M: $113,771	Less than $100M: $77,017	Less than $100M: $81,923	Less than $100M: $66,074	Less than $100M: $71,613	Less than $100M: $58,063	Less than $100M: $51,108	Less than $100M: $48,437	Less than $100M: $51,429	Less than $100M: $70,705
$100M to $499.9M: $128,355	$100M to $499.9M: $89,511	$100M to $499.9M: $83,351	$100M to $499.9M: $75,564	$100M to $499.9M: $76,549	$100M to $499.9M: $69,849	$100M to $499.9M: $51,921	$100M to $499.9M: $53,676	$100M to $499.9M: $56,732	$100M to $499.9M: $66,143
$500M or more: $192,478	$500M or more: $132,885	$500M or more: $119,702	$500M or more: $108,776	$500M or more: $111,000	$500M or more: $84,206	$500M or more: $65,558	$500M or more: $60,598	$500M or more: $65,938	$500M or more: $85,685

Continued from page 44

"Insurance is fiscally very conservative," Bauschinger says, adding that her recent 7% raise was her first since 1993. At her company, a network administrator received just $36,000 in base pay, far below the Bay area average, and lower than the national average for the industry. "In insurance, paper is real," she says. "Electronic data is somehow unreal. I believe this weltanschauung is about to change rather abruptly, as insurance companies realize that the Internet can save them money in processing time."

Lifting All Boats

The well-publicized large pay hikes two years ago were largely intended to bring substandard salaries up to realistic levels. Some industries that have traditionally offered low pay for IT professionals, such as education, have continued to raise salaries in order to compete for skilled workers.

John Edwards, technology director at the Huntington Union Free School District in Huntington, N.Y., says salaries for his nine-person IT staff range from $38,000 for a help desk manager to the mid-80s. Those salaries are low for the New York area, but they're completely in line with areas such as Baltimore and Seattle and higher than offerings in Dallas, Miami or San Diego.

"School districts used to treat technology personnel as ancillary, like clerical workers or custodians," Edwards observes. "The highest-paid technical person [once] received $20,000 or so. Now districts are finding that paying for technology is like paying the light bill: It's becoming a necessity. And they

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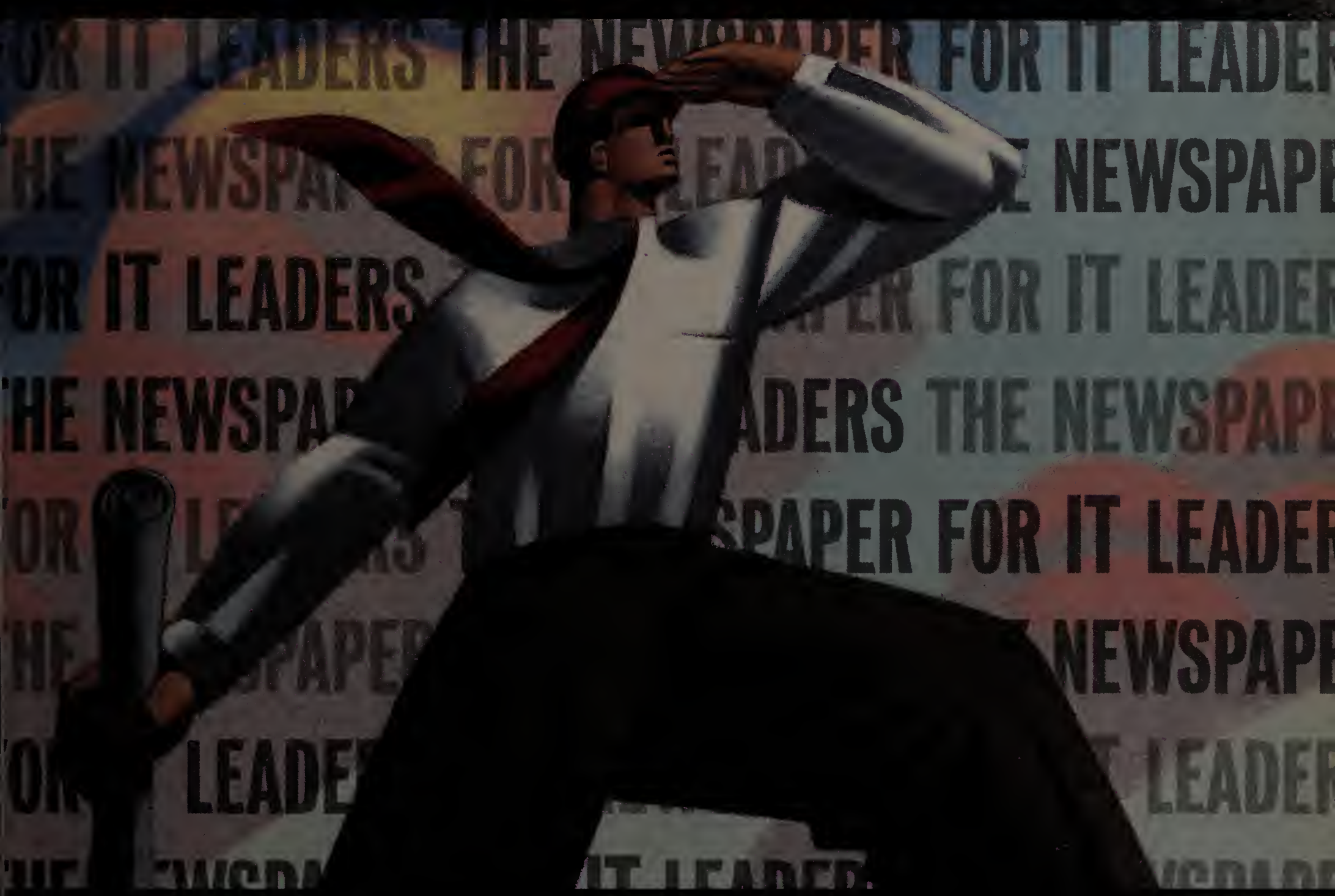
ARE YOU BUILDING THE

IT ECONOMY?



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IT Leaders have key qualities. They have precious IT skills and they drive the business strategies for the IT agenda. If you're one of them, you're a powerbroker for your organization. You're using technology to pioneer new frontiers of business processes and competitive advantage.

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BUSINESS SPECIAL REPORT

13TH ANNUAL SALARY SURVEY

SYSTEMS DEVELOPMENT AND INTEGRATION

Project Leader	Senior Systems Analyst	Systems Analyst/ Administration	Senior Systems Programmer	System Programmer	Senior Programmer/ Analyst	Programmer/ Analyst	Database Manager	Database Analyst	Webmaster/ Web Designer
Average Salary: **$63,689**	Average Salary: **$59,755**	Average Salary: **$53,628**	Average Salary: **$59,657**	Average Salary: **$51,089**	Average Salary: **$56,529**	Average Salary: **$46,566**	Average Salary: **$64,128**	Average Salary: **$57,144**	Average Salary: **$50,688**
Bonus: **$3,901**	Bonus: **$3,585**	Bonus: **$3,398**	Bonus: **$3,313**	Bonus: **$2,285**	Bonus: **$2,861**	Bonus: **$2,326**	Bonus: **$4,040**	Bonus: **$2,986**	Bonus: **$2,461**
Total: **$67,590**	Total: **$63,340**	Total: **$57,026**	Total: **$62,970**	Total: **$53,374**	Total: **$59,390**	Total: **$48,892**	Total: **$68,168**	Total: **$60,130**	Total: **$53,149**

TOTAL COMPENSATION BY INDUSTRY NONMANUFACTURING

Cnst.	$90,000	Construction	$90,000	Bus. Service, Cons. & Sys. Int.	$77,182	Utilities	$76,667	Bus. Service, IT	$65,000	Bus. Service, Cons. & Sys. Int.	$74,250	Bus. Service, Cons. & Sys. Int.	$68,938	Fin. Orgs.	$92,750	Bus. Service, Cons. & Sys. Int.	$73,650	Nonprofit	$86,250
Bus. Service, Cons. & Sys. Int.	$80,444	Telecomm.	$77,000	Fin. Orgs.	$68,033	Bus. Service, Cons. & Sys. Int.	$76,067	Bus. Service, Cons. & Sys. Int.	$64,538	Utilities	$72,333	Utilities	$59,900	Bus. Service, Cons. & Sys. Int.	$78,179	Fin. Orgs.	$69,467	Fin. Orgs.	$67,353
Fin. Orgs.	$79,905	Bus. Service, Cons. & Sys. Int.	$76,969	Insurance	$66,056	Fin. Orgs.	$74,538	Media	$64,250	Fin. Orgs.	$66,054	Construction	$59,375	Transportation	$77,929	Retail	$64,500	Utilities	$67,000
Utilities	$76,000	Media	$72,333	Bus. Service, IT	$65,333	Bus. Service, IT	$73,333	Fin. Orgs.	$62,500	Bus. Service,Non-IT	$66,050	Fin. Orgs.	$57,854	Telecomm.	$76,667	Telecomm.	$63,800	Bus. Service, IT	$65,500
Bus. Service, IT	$73,500	Insurance	$71,462	Telecomm.	$65,000	Media	$69,417	Utilities	$62,500	Media	$65,600	Nonprofit	$54,083	Insurance	$75,167	Utilities	$63,333	Insurance	$63,563
Insurance	$72,273	Fin. Orgs.	$71,306	Media	$62,900	Telecomm.	$67,167	Telecomm.	$60,000	Bus. Service, IT Non-IT	$64,417	Bus. Service, Non-IT	$52,500	Bus. Service, Non-IT	$72,700	Insurance	$62,500	Bus. Service,	$60,594
Telecomm.	$72,000	Bus. Service, IT	$66,900	Transportation	$56,625	Insurance	$66,542	Health Care	$55,444	Insurance	$60,000	Bus. Service, IT	$51,417	Health Care	$72,328	Media	$62,333	Media	$60,100
Media	$70,500	Utilities	$65,300	Whlsl./Dist.	$55,000	Whlsl./Dist.	$66,500	Insurance	$53,889	Retail	$59,650	Media	$51,100	Bus. Service, IT	$72,250	Bus. Service, IT	$61,500	Transportation	$58,357
Retail	$69,500	Retail	$65,000	Other	$53,500	Construction	$65,000	Construction	$49,500	Transportation	$59,042	Telecomm.	$50,750	Utilities	$71,625	Construction	$60,000	Construction	$57,500
Transportation	$65,786	Transportation	$63,850	Utillties	$53,100	Health Care	$57,021	Govemment	$47,667	Construction	$58,000	Retail	$50,167	Whlsl./Dist.	$65,125	Transportation	$58,750	Telecomm.	$54,167
Health Care	$65,768	Govemment	$59,197	Government	$52,250	Transportation	$55,800	Retail	$47,500	Health Care	$57,597	Insurance	$49,548	Retail	$60,000	Whlsl./Dist.	$57,500	Health Care	$54,018
Government	$60,222	Whlsl./Dist.	$57,250	Health Care	$50,513	Govemment	$53,484	Transportation	$46,600	Telecomm.	$56,000	Transportation	$48,857	Media	$59,500	Health Care	$57,250	Govemment	$47,155
Bus. Service,Non-IT	$59,000	Other	$55,000	Construction	$48,500	Educ	$51,786	Whlsl./Dist.	$46,500	Whlsl./Dist.	$54,857	Whlsl./Dist.	$48,000	Govemment	$55,288	Government	$54,596	Bus. Service, Non-IT	$48,375

TOTAL COMPENSATION BY INDUSTRY MANUFACTURING

Pharmaceutical	$84,200	Pharmaceutical	$77,333	Wood/Paper	$75,000	Computer HW/ SW/Periph.	$89,167	Aerospace/ Defense	$70,250	Aerospace/ Defense	$88,333	Aerospace/ Defense	$73,500	Pharmaceutical	$87,000	Pharmaceutical	$75,000	Pharmaceutical	$87,000
Petroleum Prod./Explor.	$78,750	Electronics	$75,400	Aerospace/ Defense	$69,000	Pharmaceutical	$80,000	Consumer Products	$64,333	Computer HW/ SW/Periph.	$69,929	Pharmaceutical	$55,600	Petroleum Prod./Explor.	$84,000	Aerospace/ Defense	$69,500	Consumer Products	$74,500
Electronics	$77,667	Aerospace/ Defense	$75,200	Petroleum Prod./Explor.	$68,750	Aerospace/ Defense	$77,750	Chemical	$62,500	Consumer Products	$69,250	Consumer Products	$54,667	Aerospace/ Defense	$82,500	Chemical	$68,333	Aerospace/ Defense	$71,250
Aerospace/ Defense	$71,200	Consumer Products	$74,000	Pharmaceutical	$68,333	Chemical	$75,000	Petroleum Prod./Explor.	$60,500	Pharmaceutical	$66,000	Electronics	$51,583	Computer HW/ SW/Periph.	$78,167	Electronics	$68,333	Electronics	$66,250
Computer HW/ SW/Periph.	$70,083	Petroleum Prod./Explor.	$71,500	Electronics	$61,800	Petroleum Prod./Explor.	$71,500	Pharmaceutical	$60,000	Electronics	$62,667	Chemical	$50,333	Metal/Plastic/ Rubber/Glass	$73,389	Food/Bev./ Tobacco	$67,000	Petroleum Prod./Explor.	$63,000
Chemical	$70,000	Chemical	$70,500	Consumer Products	$60,000	Consumer Products	$68,250	Computer HW/ SW/Periph.	$59,583	Chemical	$61,000	Industrial Equip.	$49,550	Consumer Products	$73,333	Petroleum Prod./Explor.	$59,750	Food/Bev./ Tobacco	$61,333
Consumer Products	$69,750	Computer HW/ SW/Periph.	$64,400	Computer HW/ SW/Periph.	$57,000	Automotive	$68,000	Electronics	$59,000	Metal/Plastic/ Rubber/Glass	$60,559	Petroleum Prod./Explor.	$49,000	Food/Bev./ Tobacco	$68,667	Consumer Products	$56,000	Chemical	$58,500
Metal/Plastic/ Rubber/Glass	$65,556	Automotive	$63,833	Industnal Equip.	$56,250	Metal/Plastic/ Rubber/Glass	$66,067	Wood/Paper	$54,000	Petroleum Prod./Explor.	$60,000	Computer HW/ SW/Periph.	$48,417	Electronics	$65,000	Metal/Plastic/ Rubber/Glass	$54,500	Metal/Plastic/ Rubber/Glass	$56,500
Wood/Paper	$64,500	Apparel/Textile	$62,000	Metal/Plastic/ Rubber/Glass	$56,000	Electronics	$64,400	Food/Bev./ Tobacco	$50,900	Wood/Paper	$55,429	Metal/Plastic/ Rubber/Glass	$46,750	Chemical	$64,875	Computer HW/ SW/Periph.	$52,250	Computer HW/ SW/Periph.	$53,800

TOTAL COMPENSATION BY COMPANY SIZE (COMPANIES RANKED BY REVENUE)

Less than $100M: **$60,183**	Less than $100M: **$60,176**	Less than $100M: **$51,422**	Less than $100M: **$61,048**	Less than $100M: **$51,777**	Less than $100M: **$54,990**	Less than $100M: **$45,137**	Less than $100M: **$59,500**	Less than $100M: **$54,385**	Less than $100M: **$48,422**
$100M to $499.9M: **$63,826**	$100M to $499.9M: **$61,380**	$100M to $499.9M: **$59,472**	$100M to $499.9M: **$60,988**	$100M to $499.9M: **$52,719**	$100M to $499.9M: **$58,427**	$100M to $499.9M: **$47,829**	$100M to $499.9M: **$68,452**	$100M to $499.9M: **$58,828**	$100M to $499.9M: **$51,333**
$500M or more: **$73,608**	$500M or more: **$67,517**	$500M or more: **$61,334**	$500M or more: **$66,997**	$500M or more: **$55,620**	$500M or more: **$63,479**	$500M or more: **$54,806**	$500M or more: **$75,009**	$500M or more: **$75,009**	$500M or more: **$58,623**

Continued from page 46

have to stay competitive."

The change in philosophy, along with a comfortable work environment, means Huntington School District can keep good people. "This is a good place to work," Edwards says. "My top technician was offered more money in a different business, and he decided to stay."

Overall, the biggest nonmonetary driver for most IT employees in 1999 is the right work environment. "People want the right tools and the right training to do their job," says Duff & Phelps' Stewart. "They don't want things to be serious at all times. And they want a little freedom to express themselves."

Fryer is a freelance writer in Santa Cruz, Calif.

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Like what you see?

Whether it's yes or no, we want to know how you feel about your IT salary, bonuses and benefits. Participate in *Computerworld*'s Second Online Salary Satisfaction Survey beginning September 13, visit our Web site: **www.computerworld.com/more**

Methodology

Computerworld's Annual Salary was mailed to 10,000 IT managers and senior executives in June and July, 1999.

Our survey asked about annual salaries, annual salary increases and additional compensation.

A total of 823 respondents representing approximately 469,144 employees provided data on multiple job titles.

BUSINESS SPECIAL REPORT

13TH ANNUAL SALARY SURVEY

SYS. DEV. & INTEGRATION	TECHNICAL SERVICES AND OPERATIONS					PC END-USER SUPPORT			
Mgr. of Internet/ Intranet Tech.	Computer Operations Mgr./ DP Manager	Computer Operations Supervisor	Lead Computer Operator	Computer Operator	Technical Specialist	Micro Mgr., End-User Computing Mgr.	Technical Support Mgr./ Help Desk Mgr.	Help Desk Operator	PC Technical Support Specialist
Average Salary: **$65,521** Bonus: **$4,125** Total: **$69,646**	Average Salary: **$61,595** Bonus: **$4,479** Total: **$66,074**	Average Salary: **$48,379** Bonus: **$2,308** Total: **$50,687**	Average Salary: **$37,652** Bonus: **$1,566** Total: **$39,218**	Average Salary: **$31,192** Bonus: **$1,177** Total: **$32,369**	Average Salary: **$39,563** Bonus: **$1,646** Total: **$41,209**	Average Salary: **$51,594** Bonus: **$2,392** Total: **$53,986**	Average Salary: **$46,720** Bonus: **$2,270** Total: **$48,990**	Average Salary: **$33,511** Bonus: **$1,448** Total: **$34,959**	Average Salary: **$36,216** Bonus: **$1,502** Total: **$37,718**

BY INDUSTRY NONMFG.	TOTAL COMPENSATION BY INDUSTRY NONMANUFACTURING															
Fin. Orgs.	$93,167	Bus. Service, Cons. & Sys. Int.	$89,550	Bus. Service, Cons. & Sys. Int.	$75,444	Bus. Service, Cons. & Sys. Int.	$67,600	Construction	$82,500	Construction	$70,000	Construction	$75,000	Bus. Service, Cons. & Sys. Int.	$65,154	Construction	$42,500	Construction	$48,750
Bus. Service, Cons. & Sys. Int.	$80,200	Utilities	$77,750	Construction	$75,000	Bus. Service, IT	$49,000	Bus. Service, Cons. & Sys. Int.	$49,000	Bus. Service, IT	$55,833	Bus. Service, Cons. & Sys. Int.	$73,167	Fin. Orgs.	$64,904	Other	$41,833	Fin. Orgs.	$43,450
Bus. Service, IT	$78,000	Construction	$75,000	Other	$68,000	Construction	$44,000	Bus. Service, IT	$38,250	Bus. Service, Cons. & Sys. Int.	$54,107	Fin. Orgs.	$67,375	Insurance	$62,250	Bus. Service, Cons. & Sys. Int.	$40,536	Bus. Service, Cons. & Sys. Int.	$41,722
Transportation	$76,667	Fin. Orgs.	$72,976	Utilities	$59,500	Utilities	$43,800	Utilities	$37,143	Fin. Orgs.	$48,962	Insurance	$60,000	Utilities	$60,000	Bus. Service, IT	$40,125	Bus. Service, IT	$41,667
Whlsl./Dist.	$76,000	Insurance	$68,929	Fin. Orgs.	$55,433	Other	$42,000	Media	$33,971	Insurance	$45,214	Other	$57,500	Bus. Service, IT	$58,000	Utilities	$38,750	Utilities	$41,600
Health Care	$72,125	Whlsl./Dist.	$68,063	Telecomm.	$52,667	Transportation	$41,750	Fin. Orgs.	$33,024	Whlsl./Dist.	$43,800	Bus. Service, IT	$56,333	Health Care	$50,500	Bus. Service, Non-IT	$38,727	Transportation	$41,143
Insurance	$71,429	Other	$68,000	Media	$51,333	Telecomm.	$41,375	Telecomm.	$32,750	Transportation	$43,250	Retail	$52,500	Other	$50,333	Media	$38,214	Other	$40,143
Media	$71,250	Bus. Service, IT	$67,500	Insurance	$50,313	Fin. Orgs.	$40,605	Transportation	$31,417	Nonprofit	$43,000	Health Care	$52,182	Government	$49,727	Fin. Orgs.	$35,962	Insurance	$39,692
Utilities	$70,000	Telecomm.	$66,917	Government	$49,103	Media	$40,000	Government	$31,388	Retail	$41,500	Utilities	$51,500	Transportation	$49,417	Transportation	$35,083	Media	$39,222
Other	$68,000	Media	$65,417	Health Care	$45,346	Government	$39,288	Insurance	$31,250	Health Care	$39,768	Transportation	$51,125	Media	$47,600	Health Care	$34,515	Government	$37,228
Cnst.	$65,000	Health Care	$61,833	Bus. Service, IT	$44,250	Health Care	$36,958	Other	$31,000	Bus. Service, Non-IT	$39,400	Government	$50,661	Retail	$44,722	Insurance	$34,409	Nonprofit	$36,813
Telecomm.	$57,500	Bus. Service, Non-IT	$61,500	Transportation	$43,571	Insurance	$36,375	Nonprofit	$30,125	Government	$38,280	Media	$50,071	Construction	$44,667	Government	$34,313	Retail	$36,611
Government	$57,222	Transportation	$61,500	Nonprofit	$42,600	Retail	$34,571	Health Care	$29,991	Utilities	$35,333	Telecomm.	$50,000	Bus. Service, Non-IT	$42,111	Educ	$32,103	Health Care	$36,274

BY INDUSTRY MANUFACTURING	TOTAL COMPENSATION BY INDUSTRY MANUFACTURING															
Petroleum Prod./Explor.	$102,750	Petroleum Prod./Explor.	$110,750	Consumer Products	$93,000	Aerospace/ Defense	$62,667	Aerospace/ Defense	$54,333	Pharmaceutical	$54,000	Petroleum Prod./Explor.	$87,500	Petroleum Prod./Explor.	$84,000	Petroleum Prod./Explor.	$51,500	Aerospace/ Defense	$51,500
Aerospace/ Defense	$92,500	Industrial Equip.	$82,250	Industrial Equip.	$79,500	Petroleum Prod./Explor.	$59,250	Agriculture/ Mining	$28,000	Industrial Equip.	$50,900	Electronics	$67,333	Pharmaceutical	$57,500	Pharmaceutical	$47,500	Petroleum Prod./Explor.	$45,500
Food/Bev./ Tobacco	$79,125	Aerospace/ Defense	$79,750	Petroleum Prod./Explor.	$76,250	Electronics	$44,333	Apparel/Textile	$30,000	Petroleum Prod./Explor.	$48,250	Aerospace/ Defense	$67,200	Aerospace/ Defense	$56,200	Wood/Paper	$46,500	Pharmaceutical	$42,500
Chemical	$70,000	Electronics	$78,333	Aerospace/ Defense	$69,667	Wood/Paper	$42,250	Automotive	$39,500	Aerospace/ Defense	$44,000	Food/Bev./ Tobacco	$58,000	Electronics	$52,500	Aerospace/ Defense	$44,500	Computer HW/ SW/Periph.	$41,083
Industrial Equip.	$68,000	Consumer Products	$73,833	Agriculture/ Mining	$65,000	Food/Bev./ Tobacco	$42,000	Chemical	$35,500	Electronics	$44,000	Consumer Products	$55,750	Food/Bev./ Tobacco	$52,500	Consumer Products	$36,625	Electronics	$40,500
Metal/Plastic/ Rubber/Glass	$66,700	Metal/Plastic/ Rubber/Glass	$72,167	Electronics	$63,333	Consumer Products	$40,000	Computer HW/ SW/Periph.	$28,250	Consumer Products	$42,000	Metal/Plastic/ Rubber/Glass	$55,143	Automotive	$50,000	Computer HW/ SW/Periph.	$35,500	Wood/Paper	$39,917
Electronics	$68,500	Wood/Paper	$69,000	Food/Bev./ Tobacco	$59,500	Agriculture/ Mining	$37,500	Electronics	$32,800	Food/Bev./ Tobacco	$41,300	Computer HW/ SW/Periph.	$53,000	Wood/Paper	$46,333	Electronics	$35,200	Food/Bev./	$37,000
Computer HW/ SW/Periph.	$65,167	Chemical	$68,000	Metal/Plastic/ Rubber/Glass	$55,429	Chemical	$37,000	Food/Bev./ Tobacco	$30,917	Wood/Paper	$40,000	Industrial Equip.	$52,250	Metal/Plastic/ Rubber/Glass	$45,182	Apparel/Textile	$34,750	Chemical	$36,200
Consumer Products	$55,000	Food/Bev./ Tobacco	$62,050	Computer HW/ SW/Periph.	$54,000	Metal/Plastic/ Rubber/Glass	$35,800	Consumer Products	$30,875	Metal/Plastic/ Rubber/Glass	$39,611	Chemical	$50,000	Consumer Products	$44,000	Metal/Plastic/ Rubber/Glass	$32,125	Industrial Equip.	$36,111

COMPANY SIZE (BY REVENUE)	TOTAL COMPENSATION BY COMPANY SIZE (COMPANIES RANKED BY REVENUE)					PC END-USER SUPPORT			
	Less than $100M: **$60,183** $100M to $499.9M: **$63,826** $500M or more: **$73,608**	Less than $100M: **$60,176** $100M to $499.9M: **$61,380** $500M or more: **$67,517**	Less than $100M: **$51,422** $100M to $499.9M: **$59,472** $500M or more: **$61,334**	Less than $100M: **$61,048** $100M to $499.9M: **$60,988** $500M or more: **$66,997**	Less than $100M: **$51,777** $100M to $499.9M: **$52,719** $500M or more: **$55,620**	Less than $100M: **$54,990** $100M to $499.9M: **$58,427** $500M or more: **$63,479**	Less than $100M: **$45,137** $100M to $499.9M: **$47,829** $500M or more: **$54,806**	Less than $100M: **$59,500** $100M to $499.9M: **$68,452** $500M or more: **$75,009**	Less than $100M: **$54,385** $100M to $499.9M: **$58,828** $500M or more: **$75,009**	Less than $100M: **$48,422** $100M to $499.9M: **$51,333** $500M or more: **$58,623**

Average number IS/IT employees
Manufacturing 341
Nonmanufacturing 700

Average number of employees
Manufacturing 6,038
Nonmanufacturing 4,783

Est. 1999 annual revenue ($M)
Manufacturing $1,373
Nonmanufacturing $1,404

Base responses by job title:

Top IS/IT Management:
CIO/ VP of IS/ IT 313
Director IS/ MIS 431
Director, Systems Dev. 234
Director of Networks 214
Director, IS/IT Operations 224

Networks:
Mgr. of Voice & Data Comm. 207
Communications Specialist 191
Network Administrator/ Analyst 427
LAN Manager 271

Systems Development and Integration:
Project Mgr., Sys & Programming 258
Project Leader 220
Senior Systems Analyst 261
Systems Analyst/ Administration 184
Senior Systems Programmer 194
System Programmer 175
Senior Programmer/Analyst 292
Programmer/Analyst 354
Database Manager 195
Database Analyst 156
Webmaster/Web Designer 200
Mgr. of Internet/Intranet Tech. 120

Technical Services & Operations:
Computer Operations Manager/ Data Processing Manager 226
Computer Operations Supervisor 169
Lead Computer Operator 217
Computer Operator 286
Technical Specialist 183

PC End-User Support:
Micro Mgr., End-User Comp. Mgr. 171
Tech Supt Mgr./ Help Desk Mgr. 257
Help Desk Operator 268
PC Tech Support Specialist 354
Mgr. of Internet/Intranet Tech 120
Total 7,372

Note:
Vertical industry salary figures are not a statistically valid measure of average salaries for those industries but should be used for comparative rankings only. Averages by title and company size are a more reliable measure of typical salaries.

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WHEN 'E' STANDS FOR EUROPE

FROM PARIS, TEXAS, to Paris, France, information technology experts believe that the European e-commerce market is set to blossom over the next five years.

But are American companies ready for Europe's imminent e-revolution? Delegates at a recent Dataquest conference in Paris were told that though European Internet use is growing at an annual rate of 99%, retailers and companies will have to act quickly to satisfy the demand that will result from improved technologies and increased Internet access. European e-commerce will be further boosted over the next few years by the euro.

However, Americans who want to lure European buyers to their Web sites will have to jump many hurdles they don't see in the U.S.: muddled European Union trading and privacy legislation, a corporate conservatism in some countries, cultural and linguistic differences and high prices for telecommunications services.

One hindrance is the tangle of cross-border regulations governing commerce. E-commerce legal specialist Holly Towle, a partner at Washington law firm Preston Gates & Ellis LLP, points out that many companies wrongly assume that EU directives are the equivalent of U.S. federal legislation.

Towle cites the EU Distance Contract Directive as a case in point. "Under the EU rule, a U.S. company could deliver an absolutely perfect product after making full disclosure of all elements required by the rule, and still the EU customer could return it for any or no reason," she says. "That concept simply does not exist in the U.S. and should cause many sellers to refuse to incur the costs, delays and risks of shipping products into the EU."

European privacy laws could also aid Internet scam artists, according to Jay Valentine, CEO of InfoGlide, an Austin, Texas-based company that has developed a specialized search engine for detecting Internet fraud.

"We recently broke a major auto fraud ring, where people committed accidents in the Netherlands with autos insured in France. They falsified data and thus became invisible to computers, knowing Europe's privacy laws would protect them from being found," he says.

Cultural differences play an important role in determining the pace of e-commerce development. Europeans are more reluctant than Americans to buy online, although research

The e-business revolution is coming to Europe, but U.S. companies that don't do their legal legwork and cross-cultural homework and insist on English will look dumb and ugly By Dermot McGrath

TRAVELOCITY'S NED BOOTH says U.K. and German consumers are more comfortable shopping online than southern Europeans

REID HORN

suggests such resistance is crumbling.

Framingham, Mass.-based International Data Corp. (IDC) found that although only 11% of European Internet users made online purchases in the last three months of 1998, that figure is expected to grow to 25% by 2002. In that same year, IDC predicts Internet usage will swell to 35% of Western European consumers, which is about the same level it's at in the U.S. today.

But such changes may be slow to filter through to the European corporate sector, which is frequently perceived by Americans as overly conservative.

Certainly, European consumers have erred on the side of caution when it comes to Internet commerce, but Stefan Elmer, a European research analyst at IDC, dismisses the idea that Europeans are against buying online. "Europeans are definitely not against doing business on the Web — they just need to see a clear reason for doing so," he says.

Exploiting the retail potential in such a culturally diverse market presents one of the greatest challenges. Jorden Woods, CEO of San Jose-based e-commerce software producer Global Sight Corp., says, "Economies of scale are essentially diminished by the fragmentation caused by language and culture."

Furthermore, the pace of e-commerce development differs throughout the continent. Colum Joyce, e-commerce strategy manager at DHL Worldwide Express in Brussels, says he believes that applying the U.S. Internet shopping model — where a single marketing and e-commerce strategy is usually sufficient for all states — to the rest of the world is far less straightforward than many Americans believe. "The comparison is not between the U.S. and Europe, but between the U.S. and the U.K., the U.S. and Germany or the U.S. and Italy," he says.

As a general rule, northern Europe is more Internet-friendly than the south, which may be partially explained by cultural factors.

"U.K. and German consumers are more comfortable shopping and purchasing goods via online media services, whereas southern Europeans seem to be more tied to personal relationships with local shop owners," suggests Ned Booth, manager of product marketing at Travelocity, an online travel agency in Fort Worth, Texas.

But all European consumers prefer to conduct business on the Internet in their native language. It's a lesson too many companies seem loath to learn, according to Bill Dunlap, founder of San Francisco-based GlobalReach, which specializes in multilingual e-commerce marketing. U.S. companies, he says, still want to use English to sell to Europeans and think that most Europeans who go online speak English.

He advises firms "to translate at least several pages of their site into most European languages and promote the language gateways" in the countries where those languages are spoken. That will help bring in more visitors. But if more of the site isn't translated, many non-English speakers will leave it, he says.

Part of that reaction stems from a resistance to what Europeans perceive as the diluting of their cultural identities. "In Europe, the Internet [has been] viewed as very much a part of American culture — not necessarily a benefit in countries where *American* and *culture* are often seen as conflicting [terms]," says Sharon Paine, U.K. director of emerging technologies at Interim Technology's Consulting Group in Oak Brook, Ill.

For most small American enterprises, the cost of Web site localization and setting up distribution and marketing networks is a major disincentive for independent expansion into Europe. Top-level localization software offerings, such as Global Sight's Ambassador product, can cost about $100,000, — enough to frighten many small and medium-size businesses.

But smaller companies can make an inexpensive start by translating principal Web site material into one or two languages and then finding a European partner to help with local distribution, payment and backup services.

Marty Secada, president of IT consulting firm General Web & e.Commerce in Stamford, Conn., says trading alliances offer the best way for U.S. businesses to gain footholds in Europe.

"If you are European, hook up with a venture capital firm immediately and look to partner with American technologists for delivery," he advises. "If you are American, hook up with European product visionaries, people who understand [supply] chain management — and, of course, raise the capital necessary to make a sustained effort."

Larry Levy, CEO of U.K.-based Protege Software Ltd., urges firms to act quickly to capitalize on the opportunities presented by new markets.

"Companies will need to think globally but act locally if they are to maximize their opportunities in e-commerce, and local marketing will need to be backed up by local infrastructure," he says.

"The U.S.-centric Web site, where customers buy in U.S. dollars and ship by FedEx, is simply not going to cut it in Europe," he adds.

McGrath is a freelance writer in Paris.

Selling over the Web in Europe

- **Do your homework.** Europe isn't a facsimile of the U.S. market. Each country must be treated individually.
- **Study your target market.** Know the legal requirements, delivery costs and tax charges for each country. Take into account costs for such localized operations as after-sales service and customer help lines.
- **Remember** that marketing is far more effective in the target market's native language. Translate as needed to keep localization costs down.
- **Find local partners** and marketing experts in each country to advise you on local and cultural issues.
- **Take a measured,** deliberate approach to European penetration. Build slowly, one country or region at a time.
- **Think globally, act locally.** Web sites can be centrally managed and standardized, but product pricing and backup services are better localized.
- Register your Web site in international indexes to attract non-English-speaking visitors. Promote the foreign content like you would the English site, via press releases, direct marketing and banner advertising.
- **Highlight secure payment options.** Remember that many Europeans are still wary of online purchasing.
- **Act now.** Early positioning can be crucial in establishing market dominance. Europe is ripe for expansion; if you don't act, you can be sure your competitors will.
- **Invest for success.** Many ventures fail because of a lack of necessary capital to see projects through to completion. Give your expansion plan the financial clout it needs.

– Dermot McGrath

Mass Customization

BY STEVE ALEXANDER

IF MASS customization — tailoring products to individual customers — really is the future of manufacturing, a key to that future is information technology.

"Mass customization is not a fad. It is something that will happen, and computer technology will make a lot of it possible," says Nancy Staples, a research associate and associate professor at Pendleton, S.C.-based Clemson Apparel Research, which is affiliated with Clemson University.

Creating customer interface software for capturing the needs of individual consumers and database software for maintaining extensive customer preference information will be important to the adoption of mass customization, says B. Joseph Pine II, cofounder of management consulting firm Strategic Horizons LLP in Aurora, Ohio.

There are myriad examples of mass customization in business. Cemex, a cement company in Mexico City, uses mass customization in delivery. "They have trucks roaming the city. When you have a need for cement, they dispatch one of those loads to your construction location," Pine says.

Green Mountain Energy Resources in South Burlington, Vt., sells electricity through mass customization. It offers customized electricity from sources that pollute less than conventional coal plants. In California, the company says, it offers mixes of geothermal- and hydroelectric power. In the future, it will offer wind- and solar-generated electricity.

Andersen Corp. in Bayport, Minn., which sells windows for homes, says it uses a PC-based customization tool to help customers wade through the millions of possible window and design combinations. The tool is used by Andersen window distributors that take orders from consumers.

Clothing is one industry ripe for mass customization "because everybody has a different body shape and different tastes," Pine says. Manufacturers will need electronic order-acquisition systems that capture people's measurements over the Web or in retail stores; order-processing software to coordinate the acquisition of raw materials and the shipment of finished goods; databases to make sure custom clothing is designed to the right specifications; and computer-aided design systems that can convert custom designs into cut pieces of cloth that can be sewn together.

Inventory control is one benefit clothing manufacturers could gain from mass customization. These manufacturers tend to have high inventories of finished products and must forecast demand many months in advance. But those forecasts are likely to be wrong, resulting in surpluses of some products, Pine says.

"The apparel industry must have fire sales every season to get rid of goods that no one bought. But if they could make goods on demand, they would save money because they would not have the cost of carrying inventory, taking returns or having fire sales. So mass customization can yield a lower overall cost, and it may have additional value because often you can charge a premium for it," Pine says.

It's just a matter of time before mass customization is embraced by major clothing manufacturers for at least some of their products.

What's needed to transfer the concept of mass customization to the commercial clothing industry is for manufacturers to abandon their mass-production techniques and create flexible product-manufacturing teams that would be able to add to clothing special features such as differently shaped pockets, says Clemson's Staples. "That infrastructure is not there today."

"Consumers will demand it because they are getting so much smarter and know how things work. If the larger clothing manufacturers do it, everyone will," says Lenda Jo Anderson, an associate professor at Alabama's Auburn University who studies mass customization in the apparel industry.

Profit Potential

It's also potentially very profitable, Staples says. In one study by the American Apparel Manufacturers Association in Washington, it was estimated that if 10% of manufacturing output were devoted to mass customization, it would produce 30% of company profits.

Pine cites other examples of mass customization and the role IT plays. Japanese eyeglass maker Paris Miki uses a PC-based customer interface system that takes a digital picture of a customer's face, recommends eyeglasses that fit the shape of the customer's face and displays on a PC screen how the glasses will look when the person is wearing them. Customers can interact with the display to change the look and color of the glasses before they are manufactured, Pine says.

Besides the traditional mass customization of raw goods, the techniques are now being applied to the Web for personalization. For example, at Amazon.com Inc., a database tracks customer book purchases, and collaborative filtering software is used to recommend books the customers might want based on past purchases.

The implementation of this new technology reflects a new way top managers are thinking about customers, Pine says. In the world of mass customization, companies mustn't think about market share but about "customer share," he says. "How much of an individual's business are you getting?" ◗

Alexander is a freelance writer in Edina, Minn.

DEFINITION

Mass customization is the production of goods on a personalized basis. It helps to attract and retain individual customers. Reductions in inventory and working capital allow customized goods to be produced at the same or lower cost than mass-produced products.

Vitamins: Take Your Pick

BY STEVE ALEXANDER

Brad Oberwager, chief operating officer at San Francisco-based More.com, a Web site that offers vitamins, minerals and other dietary supplements. He was previously the president of Acumins, which first did mass customization of vitamins. More.com recently bought Acumins. Oberwager spoke with *Computerworld* about mass customization.

Q When did you begin mass customizing vitamins?

A In early 1997. I got started because my sister had undergone cancer treatment and required a mixture of vitamins. It became quite a large market, because people who take vitamins found customized Acumins very appealing; it allowed them to create a vitamin just for themselves. Mass customization let us address the vitamin, mineral and supplement market in which sales are $12 billion a year.

Q Why do you think mass customization is going to be important?

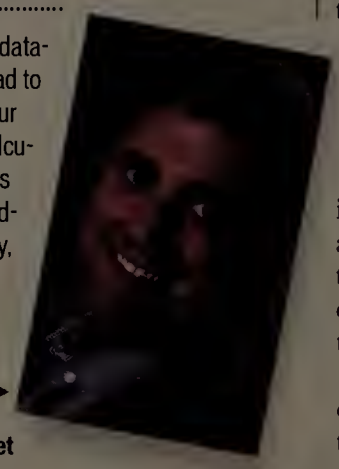
A Our society's demands are extending beyond the mass market into special things that we want right now. Mass customization, and the interaction between customer and manufacturer that goes with it, are going to become the only way that people buy products.

Q What are the benefits to business?

A Less operating expense and inventory. Another thing is the creation of a long-term business relationship with customers. It's much better from a cost perspective to keep a current customer than to get a new one. So even if your mass-customized product is not cheaper to make, it can reduce your marketing costs because it satisfies customers to such a degree that they don't leave you.

Q What information technology is driving mass customization?

A It's incredibly driven by database technology. We had to design a front end for our database that would calculate the vitamin formulas and keep track of individual customers. That way, people only have to tell us their vitamin dose one time.



BRAD OBERWAGER: ▸ Our demands go beyond the mass market

■ *Are there business terms you would like to learn about in Business QuickStudy? Please send your ideas to quickstudy@computerworld.com.*

Dear Career Adviser:

I'm one of those Internet-crazy programmers you mentioned who took lots of stock and relatively low pay to get into a company when options on shares to employees were priced well under $1. The company has already gone public and the results are not so great: The share price is down 35% for the year. So I think my options are underwater. I've been here less than a year, but I'm wondering about the worth of my options. Should I stick it out or leave and go to a similar situation at another company? — SUBMERGED

Dear Submerged:

Look at the value of the vested portion of your options and try to be more patient. Internet stocks may be down 37% from their April highs, but as of mid-August, they were still up more than 30% for the year, so you may not be as "submerged" as you think. Additionally, "by being part of a publicly traded company, your stock options have real value," says MaryJo Potter, managing director at Corporate Alliance Inc., a San Francisco compensation consulting firm. Remember, when you earn stock options, you have no time limit during which you must exercise them, only a lockup period that prevents employees and other insiders from exercising options you already own in the initial three to six months after the company goes public, and you can wait for the stock price to rise to exercise the remainder.

One more factor: Unless your company's technology or marketing plan is seriously flawed, staying where you are lets you develop real maturity to show you can weather ups and downs, which is critical to growing both a company and your own career. Of course, consult your own tax and legal counsel, but Potter and I concur: You're probably better off staying put than jumping into another pre-IPO situation.

Dear Career Adviser:

I'm looking for a job for the first time in five years because the unit of the Fortune 500 company where I am the manager of technical services responsible for telecommunications, infrastructure and client/server application development is "rightsizing."

In interviews, I'm told I'm overqualified because I have worked in multiple arenas. I have a hard time believing this makes me less valuable, especially since Internet telephony is so hot. — OVERQUALIFIED OR AN EXCUSE?

Dear Overqualified:

FRAN QUITTEL is an expert in high-tech careers and recruitment. Send questions to her at www.computerworld.com/career_adviser.

"Overqualified is correct in assessing that Internet telephony is a hot, emerging area," says Dotty Yackle, director of engineering at GRIC Communications Inc. in Milpitas, Calif., a global network provider for Internet service providers and telecommunications companies. "With the right skills, he could go next door for twice the pay."

In fact, your problem may be that interviewers feel you lack either deep technical knowledge or verifiable expertise to solve specific problems. When you interview, can you discuss a specific technologies — routers, switches and gateways — or how to solve problems with older hardware? You might also show your people- and project-management skills. If you demonstrate that you have in-depth knowledge of these technologies and down-to-earth capabilities with specific projects, then you'll find it easier to get your next job.

Dear Career Adviser:

I'm director of institutional research at a community college. My job involves data mining, Foxpro, Access, SPSS and Excel, some basic networking and Web publishing. I'm interested in becoming the information technology manager, overseeing the entire IT staff and IT-related matters: network, servers, technology use and technology planning and more. What should I do to get myself positioned and prepared for such an opportunity at the college in the next three years? — ACADEMIC INFORMATION

Dear Academic:

To see the latest trends in academic computing and job requirements, start researching free job postings at the Educause Web site (*www.educause.edu/asp/jobpost/open_jobs.asp*) or for $75 annually, visit the *Chronicle of Higher Education*'s Web site (*http://chronicle.com*).

Focus on applications that colleges and universities use to run their business, educational computing and infrastructure issues.

The business side can involve modules from PeopleSoft, Oracle, or Systems & Computer Technology Corp., focusing on applications such as student records and finance in hardware environments ranging from mainframes to Windows NT to Apple.

Then look at distance learning, videoconferencing, library science, new media and Web-based instruction, and how to implement computer services campuswide.

Though IT pay in academia can be 20% lower than in the business sector, often other perks exist like tuition benefits and opportunities to shelter retirement money.

And because colleges, universities and community colleges often outsource their IT operations, you should also investigate consulting firms like Datatel and Collegis Inc. (*www.collegis.com*). ◗

WORKSTYLES

What it's like to work in IT at Kozmo.com

Interviewee: Chris Siragusa, chief technology officer
Company: Kozmo.com Inc., an Internet-based video delivery service operating in New York, Seattle and soon San Francisco and Boston
Main location: New York
How the service works: Users order videos, digital video discs, games, snacks, magazines and books via the Web site, with guaranteed delivery within the hour via a networked order-fulfillment system.

"That's our most mission-critical system – it's designed to fulfill orders within the hour, and that's one of our strongest assets as a company. The Web site is our second most mission-critical system."
Number of information technology employees: 20; 18 in New York and one local IT person in each market.
Number of employees (end users): 60 full-time and 350 part-time (delivery personnel and others)
Average employee age: 27
Dress code: "Whatever makes you comfortable."
Workday: "I come in about 8:30 a.m. and stay until 7:30 p.m. I have developers who come in at 10 a.m. and stay late, and I have one who comes in between 11:30 a.m. and works until early in the morning."
Any pets that come to work? "We have three that live here – two cats and a dog."
Anyone else who lives there? "Not now. At one point early on we had four people living here."
Kind of offices: "Right now, we're in a basement with lots of desks on top of each other. The new place [14,000 square feet] will be a big open room, and everyone will have their own desks and phones, and we'll have a traditional conference room and a media room."
How would you describe the culture? "We don't have a set hierarchy. We have titles, but it's not an environment where you feel restricted from going to talk to the CEO, even if you're the lowliest programmer. We want to encourage that interaction."
Must people carry beepers? Cell phones? "Managers and on-call support folks all have cell phones."
Percentage of staff that telecommutes on a given day: "I'd say we have four man-days of telecommuting a week. But it's not a scheduled thing."
In-house cafeteria: "Not other than the cheap snacks – Ben & Jerry's, Pringles, candy, popcorn, sodas. I've had way too many dinners consisting of Pringles."
The one thing everyone complains about: "The fact that we're sitting on top of each other."
How does the company fit the typical Silicon Alley start-up profile? "In terms of the energy level you find and the excitement that people have about working here. You see a glint in people's eyes, especially as we get more buzz."
How does it diverge from the profile? "What's different is our operations. We are a Web site, but we're also an order fulfillment business, so we have an added layer of complexity."
Little perks: "We go out for a party after a project is finished, and we have weekly meetings outside the office – usually a lunch that the department head will pick up. We buy dinner for people who are working late, and after a certain hour at night, we pay for cabs."
Last companywide perk: "We had a big party to celebrate the launch of our Seattle office. We rented a room at Carmine's [a New York landmark Italian restaurant] and everyone came to dinner and drank too much wine, and then we all went to a bar and hung out till 3 or 4 [a.m.]."
Quote: "One of my programmers and I were talking about what we would do after Kozmo, and neither of us could think of a single job we'd want to do after this. We have such a great time here that we said we'd just keep working here. We work our tails off, but we don't mind because it's rewarding and fun."

– Leslie Goff

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TECHNOLOGY

W3C: WORLD WIDE POWER

Who's guiding the future development of the Web? To a large extent, the World Wide Web Consortium, led by Tim Berners-Lee. This centralization of power lets the W3C move quickly, speeding the growth of the Web as a platform for business and social change. But it also means Berners-Lee has the power to make or break companies through the standards he endorses. ▸ 74

SAP SHOWS R/3'S NEW FACE

SAP's rewrite of its R/3 user interface, aimed at reducing complexity for end users, is in the hands of 250 users. But for IT shops running older versions, upgrading won't be a simple matter of sliding in the new interface. ▸ 58

COVER THE IT BASICS

Robert L. Scheier points out that when it comes to keeping your Web site up and running, there's no magic technique — just the same good practices and fundamentals that IT ought to know by heart. ▸ 61

EMERGING COMPANIES

DataSage is a personalization software company and then some; it marries an already huge database of customer info with other non-Web data sources. ▸ 62

QUICKSTUDY

Here's a dilemma: The Web is inherently insecure, yet businesses rely on it to transmit critical data. One answer: IPsec, the Internet Protocol Security suite of protocols. If adopted, it would create a standard for securing IP connections on private networks. We look at how it works and what it means. ▸ 68

LOCK AND KEY

It doesn't do much good if your server add-in cards can speed data encryption but the keys used to perform the encryption are stored on a relatively vulnerable hard drive. One vendor hopes to solve that by offering a free upgrade, allowing the keys to be stored on the server boards. ▸ 60

FLASHBACK

There are Macs being introduced, and the government wants to break up a technology giant. It isn't 1999, but 1984. We look at the year of Apple's Super Bowl ad and the breakup of AT&T. ▸ 76

EXEC TECH

Wowed by low-cost scanners? We were, too, and we checked out a variety for everything from scanning business cards to high-res images. We tell you what to look for and what to watch out for. ▸ 66

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AMERADA HESS' JEFF DAVIS says Linux's mind share is growing within the company

JAMES MCGOON

LINUX GETS THE ONCE-OVER

THE ATTRACTION OF LINUX now goes beyond its low cost. Major customers praise its performance, low system requirements and administration tools. Others wonder if the open-source community can deliver the support companies need and if other vendors will back it. We look at four companies and why they decided for or against Linux. On page 58, we talk to General Motors about its evaluation of Linux.

70

New SAP Interface Is Nice But May Be a Tough Switch

Customers running versions older than R/3 4.5 could face 'major upgrade'

BY CRAIG STEDMAN

A REWRITE OF SAP R/3's user interface, aimed at making the back-office software less complex for users, has been sent to 250 companies during the past month.

But this is still just a beta-test release — or "first customer shipment," in SAP AG parlance. The production version of the R/3 4.6 revamp is due in December, and users who signed up to get the test code said SAP's contract requires them to wait for the second release before going live.

And for many, upgrading may not be a simple matter of sliding in the new user interface. Users and analysts said companies with SAP software older than R/3 4.5 — the most recent prior release — will also have to deal with big changes in the underlying enterprise resource planning system.

Putting It to the Test

Elf Atochem North America Inc. in Philadelphia is one of those users. The chemicals maker got the R/3 4.6 beta release in mid-August and is starting to test the new user interface, which is supposed to reduce the number of application screens that workers must navigate to enter orders and run other transactions.

That could make life easier for Elf Atochem's users and customers who must wait while workers try to process their orders in R/3, said Ben Vettese, the company's director of SAP applications.

But Elf Atochem uses R/3 2.2, a 4-year-old version that has been superseded by three other releases. SAP has added lots of new functionality "that we have to get our arms around" before upgrading, Vettese said. Training the company's 1,500 users will be another big undertaking, he added.

Elf Atochem wants to switch to R/3 4.6 next spring. But to make that deadline, the configuration of its R/3 system will be left as is except in cases where modifications in the way transactions get processed are "forced because of changes in the software," Vettese said.

A Major Move

Elf Atochem isn't alone. John Hagerty, an analyst at AMR Research Inc. in Boston, said the majority of SAP users are still running — and even installing — releases that predate R/3 4.5.

For them, moving to R/3 4.6 will be "a major upgrade," he said. "You really have to go in and show people a whole new way of using the software."

DA Consulting Group Inc., a Houston-based firm that does R/3 training and runs its own corporate systems on the software, is one of the lucky users that has installed R/3 4.5.

Its upgrade to R/3 4.6 should be a relatively simple swap of user interfaces, said Dean Brown, a vice president at DA Consulting — which is among the 250 companies testing the new release. But less than 15% of the firm's clients are running R/3 4.5, he added.

SAP's rewrite should give users screens "that reflect what they really do on a daily basis, not a generic view," he said. "That will let [them] concentrate less on field-by-field rote training and more on the business impact of the software."

Code-named EnjoySAP and first detailed last winter [News, March 22], R/3 4.6 uses a browser-like design that guides end users through transactions via screen tabs. Screens have been tailored for more than 80 jobs, and the user interface is more colorful. ◗

Before and After

SAP's current user interface compared with the new one in R/3 4.6:

NOW:

- Basic Windows look and feel, with application screens that are mostly gray
- Standard icons and data fields that may not be needed by all end users
- Users may need to click through three or more screens to process a transaction

COMING WITH R/3 4.6:

- Frame-based screen design akin to a Web browser, with a wider choice of colors
- Screen layouts tailored to more than 80 different jobs, with tabs to guide users through transactions
- Streamlined processing of about 50 key transactions to reduce the number of screen changes

GM Eyes Linux for 7,500 Dealer Systems

Might replace NT for order tracking

FORGET ABOUT whether the Fortune 1,000 is interested in Linux. Try the Fortune One. General Motors Corp., the largest corporation in the U.S., is reviewing Linux to run the order management applications at GM's approximately 7,500 North American dealerships.

But **David E. Hutka**, operations manager of GM Access, the dealership network, told *Computerworld* senior writer David Orenstein that the automaker is considering a move from Windows to Linux only because of how much the Microsoft Corp. operating system taxes server hardware.

MICHELLE ANTONIAN

DAVID E. HUTKA: GM may move to Linux because of its stability

Q: What use are you evaluating Linux for?

A: The IT infrastructure for the dealerships. Every GM dealer has a GM Access server that is currently running Windows NT 4.0 and is connected via satellite to our back end. The main applications [cover] order management, which is how the dealers order their cars, report sales of cars [and] find other vehicles in their area that a customer wants.

Q: Why Linux?

A: Our main problem today is not the operating system; it's the hardware and the infrastructure. We are looking at replacing the server in each dealership. While we are doing that, do we also change the operating system? We've got applications banging on the door to get in but ... we don't have the hard disk space. It's been reported that Linux is stable and has low support costs, and it has a small footprint on the hard disk and memory. The [fewer] resources the operating system takes up, the more you can do with your applications. Linux has no licensing issues.

Q: What concerns do you have?

A: It's not controlled by one company, and fragmentation can occur. One thing with Linux is they have the benefit of the hindsight of Unix, so they may be able to prevent that, but time will tell. Also, it's a new product with no long-term track record.

Q: Are the GM Access applications written specifically for Windows?

A: Our client/server apps are all Visual Basic, as far as I know. Future apps are all Web-based. If [porting to Linux] was something we could do tomorrow with the snapping of the fingers, it might not be so bad. But a mission-critical application like this really has to work the first time, and there can't be any conversion issues.

Q: How are you evaluating Linux?

A: After [LinuxWorld], I was impressed by the number of vendors that support it. The next step would be to see if we could get the [applications] we have today running. I would also look at whether this takes up less space on the hard disk ... and does the stuff run faster. At this point, we haven't committed any resources, and I haven't taken the next step of convincing upper management that that's the way to go yet. ◗

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IDG

NOTEBOOK EXTREMES

Hefty or thin, the choice is yours. Key battles in notebook market are happening at opposite ends of spectrum. Page 81

THAT'S THE WAY IT WAS

How technology helped newsman Walter Cronkite predict a landslide in the 1952 presidential election. Page 86

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Y2K MAY STALL WINDOWS 2000

Analysts pessimistic; many expect mid-2000 shipment for Microsoft operating system

BY SHARON GAUDIN

A growing number of analysts are warning users not to expect delivery of Windows 2000 before the middle of next year.

That's at least six months after the delivery date pinpointed last week by Ed Muth, Microsoft Corp.'s group product manager for Windows NT. And the delivery date Muth targeted in his statement — which came on the heels of a confirmed one-month delay in the release of the third beta of the updated operating system — is later than what Microsoft had predicted. In a statement last year, it pegged mid-1999 for the final release of Windows 2000.

Aside from any Microsoft issues, the major culprit behind analysts' prediction of a delay is the year 2000 problem and related system freezes that are expected to go into effect in the second and third quarters at many user companies.

"Based on Microsoft's history and the events coming up this year, like Y2K, I don't see them coming out

Windows 2000, page 16

JUST THE FACTS

Ripple Effect

Applications that could be affected by a Windows 2000 delay.

- Office 2000
- The BackOffice suite, including updates for:
  - SQL Server
  - Exchange Server
  - BackOffice Server

PORTALS LINK BUYERS, SELLERS

Web marketplaces cut costs, speed purchasing

BY CAROL SLIWA AND SHARON MACHLIS

Got cows?

Business users can now buy everything, be it cows, chemicals, electronic parts or paper, through Web portals designed to help them find goods and compare suppliers' prices in specific vertical industries.

Users say this emerging business-to-business purchase process will make transactions faster, simpler and potentially more cost effective.

Take electronics components. Robert Child, director of corporate purchasing at EFTC Corp., an 1,800-employee electronics maker in Denver, said it might take two or three days and 10 or 20 calls just to locate

Portals, page 16

NEWSPAPER

NO PANACEA

Farming out the headaches of the help desk to a contractor is a fast-growing trend — and it seems like such a great idea. But as national correspondent Julia King reports, CIOs are learning that a bad outsourcing deal just creates an endless loop of finger-pointing and frustrated users who can't get their technical problems solved. The upshot: Some companies are dumping their outsourcer for poor performance, bringing the help desk back in-house or renegotiating the contract to get service-level agreements.

HELP DESK OUTSOURCING

As one analyst put it, "Broken help desk processes and problems aren't going to be magically fixed by outsourcing." *See page 24.*

COMPAQ NEEDS ENTERPRISE VISION

Hurdles: User retention, product integration

BY JAIKUMAR VIJAYAN AND APRIL JACOBS

It has talked the talk. But can it walk the walk?

One year after stunning the industry with its bid to buy Digital Equipment Corp. — and seven months after the deal went through — Compaq Computer Corp. has made great strides in its bid to be perceived as an enterprise player. But that hasn't meant security for the company's enterprise users.

Compaq has promised users that it will make OpenVMS, Alpha and Digital Unix its high-end platforms of choice. But the Wintel-centric company — which purchased Digital primarily for its service capabilities — has yet to explain how it plans to do that while integrating its now broad family of technologies into a long-term enterprise strategy.

Compaq, page 103

COMPAQ CEO Eckhard Pfeiffer could be in trouble, analysts say, if product revenue slows down. Quarterly results are expected this week

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The Newspaper for IT Leaders

BRIEFS

AMD Launches 500-MHz K6-2

Advanced Micro Devices Inc. last week announced a 500-MHz version of its K6-2 processor series for low-cost PCs. The chip features AMD's 3DNow instruction set for improved multimedia performance, according to the Sunnyvale, Calif.-based company.

The chip costs $167 each in 1,000-unit quantities.

www.amd.com

ICL Releases TeamPad Handheld

ICL Handheld Systems, a La Jolla, Calif., company owned by Fujitsu Ltd. in Tokyo, recently announced the newest version of its TeamPad 7600 mobile computer. The handheld features a 7.2-in. color VGA display and up to 64M bytes of RAM. ICL claims that the product can withstand a four-foot drop to a concrete floor.

The handheld costs $3,760.

www.icl.com

S3 Unveils 3-D Graphics Accelerator

S3 Inc. last week announced the Savage2000 3-D graphics accelerator chip. In addition to 3-D graphics, the Savage2000 offers digital video playback and television and flat-panel display capabilities. It supports up to 64M bytes of memory, S3 said.

Pricing for the chip, set to ship in October, will range from $29 to $35 in quantities of 10,000, according to the Santa Clara, Calif.-based company.

www.s3.com

TI Seen Investing In Japanese Plants

Texas Instruments Inc. reportedly plans to invest more than $718 million in two Tokyo semiconductor fabrication plants.

Until last year, Dallas-based TI had a joint venture operation with Japanese electronics giant Hitachi Ltd. to develop dynamic RAM chips, but TI broke off the arrangement with Hitachi.

Rainbow Adds Storage To Encryption Card

PCI card stores private encryption keys, enhances server performance

BY ANN HARRISON

THE ADD-IN server boards that speed data encryption can now also be used to secure the keys used to perform that encryption.

Rainbow Technologies Inc. in Irvine, Calif., last month announced that users of its CryptoSwift secure server accelerator Peripheral Component Interconnect (PCI) card now have the option of upgrading their cards to secure their encryption keys.

Secure key storage protects keys that are used to sign and encrypt messages even if a cracker exploits weaknesses in the protocols, applications or operating system.

When a customer logs on to a Web site, a public encryption key is used to set up a Secure Sockets Layer tunnel for the user to log on and to identify the site via a digital certificate.

One user taking advantage of the upgrade is Cliff Reeser, director of information security at Menlo Park, Calif.-based ETrade Technologies, a unit of ETrade Group Inc. He noted that these private keys are tied to the certificate, which is usually stored on the hard drive.

If anyone broke into the server and got the keys, he could identify himself as ETrade and execute false transactions, Reeser said.

A single CryptoSwift card can handle up to 200 transactions per second and perform a reference RSA signature in less than 5 milliseconds, the company said, compared with the 15 milliseconds required for the same operation to be performed by a 500-MHz Pentium III processor.

Rainbow claims that CryptoSwift improves server response time up to 90% by offloading and accelerating public-key cryptography.

Reeser said ETrade uses two CryptoSwift cards in each of its Web servers, which together support 9,000 online stock traders at a time.

He said he selected the CryptoSwift cards over comparable products from IBM, Compaq Computer Corp.'s Tandem division and nCipher Corp. "They were PCI boards; they were the fastest things on the market; and they worked the first time we installed them," he said of the CryptoSwift cards.

Reeser said the cards were needed because the number of people on the site exceeded the capacity of its Web servers. He added that most of the capacity was taken up by the public key encryption used in the log-on process, which slows the servers down.

> For a $10,000 investment, we returned $200,000 worth of server value.
>
> CLIFF REESER, DIRECTOR OF INFORMATION SECURITY, ETRADE TECHNOLOGIES

"We got back 94% of the CPU bandwidth, which returned to us free and clear," Reeser said of the cards. "For a $10,000 investment, we returned $200,000 worth of server value."

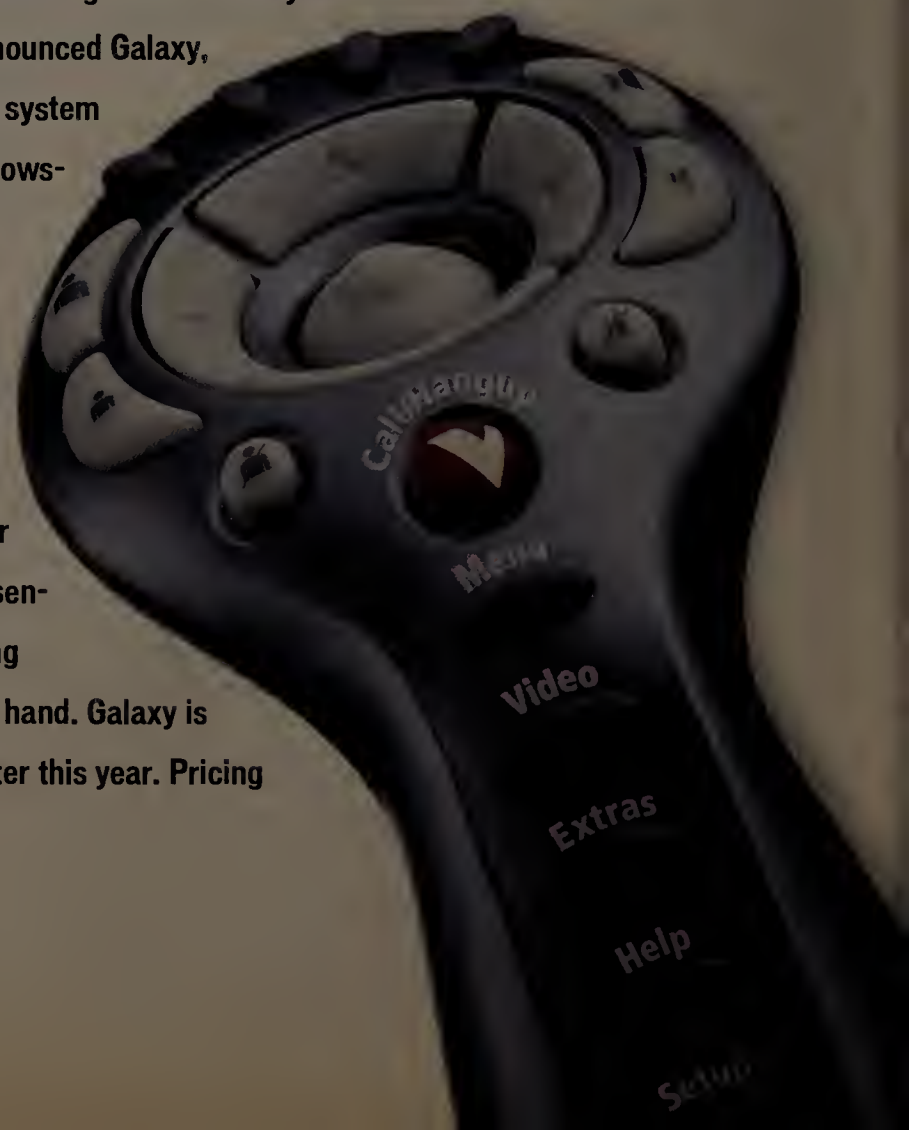
Rainbow announced last month that users can upgrade their CryptoSwift 200 cards to securely store RSA and distributed systems architecture private encryption keys.

The hardware-level key storage is currently available as an upgrade to the card's firmware and software for customers using Windows NT 4.0 and Solaris 2.6.

Pricing for the upgrade wasn't disclosed.

TAKE CONTROL

It's a TV remote. . . . No, it's a CD player remote. . . . No, it's a videoconferencing remote. Really. Last week, Vtel Corp. announced Galaxy, a videoconferencing system that includes a Windows-based interface that can be controlled via remote control. Austin, Texas-based Vtel claims that the system will let a user conduct a video presentation while operating the system with one hand. Galaxy is scheduled to ship later this year. Pricing wasn't disclosed.



Free Web Access Offer Comes Back to Bite Provider

Company says spike in Internet use in Hong Kong has other providers waiting for lines, too

BY WINNIE LAI

FOLLOWING A rapid subscriber base expansion stemming from the recent offer of free lifetime Internet access, a major Hong Kong Internet service, CTInets, is suffering from congestion problems during peak hours.

The problem lies in CTInets' inability to secure additional Integrated Services Digital Network (ISDN) lines from Cable & Wireless HKT, which connect to CTInet's modem pool, according to Vivian Fok, marketing communications manager at CTInets.

"We've already ordered new lines from HKT and are waiting," said Fok. "We are installing IDA-M [Integrated Digital Access] lines instead for the time being to ease the jam." Similar to ISDN, IDA-M lines facilitate digital connectivity but are inferior to ISDN in handling data transmissions, she said.

About two weeks ago, CTInets posted a note on its Web site to notify subscribers of a new access number to relieve the traffic on existing lines.

Fok said it was her understanding that the inability to obtain sufficient ISDN lines wasn't limited to CTInets but was a problem confronting all Internet providers in Hong Kong that require additional lines. "HKT has been running out of ISDN lines since August this year, probably due to the rapid Internet development in Hong Kong," she said.

Few Complaints

Fok said CTInets hasn't received many complaints about the problem. "The congestion occurs for several minutes only during peak hours at night when people try to connect to our servers at the same time. ... It doesn't last long," she said. Still, *Computerworld Hong Kong* found that the Internet service provider's customer hot line was frequently busy last week.

Although declining to reveal details on hot line capacity, Fok said CTInets has more than doubled the number of staff in the customer service department and will be recruiting more depending on subscriber growth.

CTInets has made a service pledge to maintain its modem usage capacity at less than 88%. In spite of the current congestion problem, the average modem usage is still below that percentage, according to Fok.

Since the announcement of the free Internet access service in mid-July, CTInets has doubled its subscriber base to 240,000, said Fok.

Lai writes for the IDG News Service in Hong Kong.

ROBERT L. SCHEIER/COMMENTARY

Nothing — and everything — works

"IT AIN'T WHAT you do, it's how you do it" is the opening line of an old rockabilly song.

It could also be the world's shortest tutorial on Web site reliability. You can buy all the extra servers and design all the fancy network architectures you want, but what you buy ain't as important as how you put it together and maintain it.

For proof, look no further than senior editor Carol Sliwa's story last week, "Net Reliability Hinges on Web Site Architecture" [News, Aug. 30]. Some e-businesses, such as Barnesandnoble.com, swear by Windows NT for their Web servers. Others, such as CDNow, trust only Unix.

ROBERT L. SCHEIER is *Computerworld*'s technology editor. He can be reached at robert_scheier@computerworld.com.

Some build sites with a presentation, or interface, layer; a middle tier housing the application's business logic; and a third tier housing the database, on the theory you can scale any layer independently. But even that might not make sense for a start-up that has no legacy databases to populate the third tier or doesn't have the capital or the need to build such a complex application.

Even if your applications are critical enough and you've got a ton of Web venture capital to throw at your infrastructure, there's no such thing as just plugging in more capacity.

Throwing more servers into your middle tier, for example, won't do much good if you haven't installed the most up-to-date operating system patches on the servers you've got (a mistake eBay reportedly made during a series of outages earlier this year).

Installing a new, more scalable version of your database won't do you much good if you haven't tested it with your existing Web application server. Even upgrading the network operating system to speed your own users' access to the Web site could stumble over something as simple as your choice of network interface cards.

Doing the proper testing and quality control up front takes time, which is a four-letter word to investors and venture capitalists who want to see revenue growth — yesterday.

It's up to the technology implementators to remind everyone that if you don't do that dull, methodical testing, you and your stock price suffer big — and in public.

Just as systems administrators found with client/server applications and network managers found with LANs, the old, dull mainframe disciplines such as planning, testing and version control are more — not less — important as time goes on.

Except this time, the systems they're building aren't buried deep in the organization. They're out there in front of customers, for the entire world to see.

BRIEFS

Free Virus E-Mail Service Offered

Sophos Inc. has announced a free electronic news service designed to get virus information to network administrators. Once they're registered at the Woburn, Mass., company's Web site, subscribers receive regular updates on viruses and hoaxes.

www.sophos.com.

Tool for Multinationals

Infonet Services Corp. in El Segundo, Calif., recently rolled out a service called Notice Mail. Aimed at multinational companies, it lets companies offer mobile and remote users a single location for Web-based e-mail, faxes, file storage and community-based forums.

Basic pricing for the service is $3.95 per user per month.

www.infonet.com

NetMind Revamps Tracking Tool

NetMind Technologies Inc. in Campbell, Calif., recently announced Mind-it 3.0, a new version of its free online service that tracks changes to Web information and notifies users by e-mail when those changes occur.

The new version is faster and includes personalization features such as the My Mind-it page, which lets users glance at the pages they are tracking.

www.netmind.com

SNAPSHOT

Feeling Safe

How confident are you in your company's virus protection?

Extremely confident	7%
Very confident	40%
Somewhat confident	42%
Not very confident	9%
Not at all confident	2%

SOURCE: INTELLIQUEST INC., AUSTIN, TEXAS

A New Dimension in Personalization Tools

DataSage offers software that combines online and off-line customer information

BY CYNTHIA MORGAN

A LOOK AT PAST *Computerworld* issues shows that companies doing some sort of personalization or one-to-one relationship management on the Web have taken an impressive number of Emerging Company spots. No wonder: Personalization software is the best way to distinguish Web commerce from brick-and-mortar commerce and a big reason to cheer the future of e-commerce.

This week's start-up, DataSage Inc. in Reading, Mass., is also a personalization software company. Like many other companies previously profiled, DataSage collects data on Web visitors' behaviors and mines the huge database that results for information on buying patterns. That information can be used to select products and discounts that are most likely to result in a sale or to reorganize information to ease navigation.

But DataSage goes much further. It marries an already huge database of a customer's click streams, shopping-cart holdings and queries with other non-Web data sources, such as off-line purchases and queries, customer service records and product registrations.

The result is a Web site that not only knows what you're buying online but also your entire company relationship. It might, for example, notice that you have complained to customer support about the lack of a double-ink cartridge for your fax machine and automatically notify you when such a product becomes available. Or it could notice that you purchase home improvement books every time your address changes and offer you special discounts next time.

DataSage calls the extended personalization system "three-dimensional individualization." It's very attractive for companies that want a strong online revenue stream without damaging well-established off-line customer relationships.

The amount of data is staggering, though, and it takes something more than a simple database analysis tool to crunch the information into usable predictions. According to DataSage founder David Blundin, there's so much data that even relatively sophisticated neural networks choke on the processing.

Blundin's background includes artificial intelligence work at MIT, neural network research and a stint at decision-support/online analytical support vendor MicroStrategy Inc. in Vienna, Va. Blundin decided to build his own predictive modeling system using a new series of pattern-recognition algorithms. Dubbed CirrusNet, it has also been licensed to Cupertino, Calif.-based NeoVista Software Inc., a developer of retail and financial decision-analysis software. It's at the heart of most of DataSage's lineup, including the NetCustomer personalization tool.

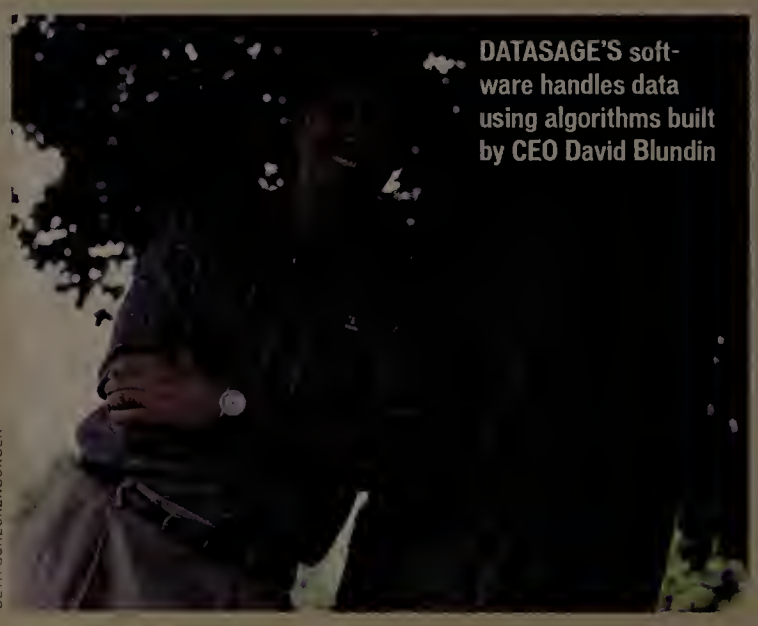
Analysis Goal

NetCustomer gives extensive information on your customers' dealings with the company, relying on its proprietary analytical tools as well as more conventional database analysis techniques. The product ships with prebuilt models that can segment customers into buying groups, identify cross-selling or upselling opportunities and measure the impact of marketing/advertising campaigns on specific products.

Of course, personalization systems remain a wild frontier as far as standards are concerned; DataSage and its rivals aren't shy about being proprietary in this still-developing marketplace. They will use many methods to achieve what amounts to the same end, which could be a headache for customers who decide to switch developers in the middle of a personalization project.

The personalization market is already showing signs of consolidation. Net Perceptions in Eden Prairie, Minn., recently absorbed another personalization toolmaker, NetGravity Inc. in San Mateo, Calif. And NetPerceptions divided the assets of pioneer personalizer Firefly Network Inc. in Cambridge, Mass., which built several of the few standards that exist, between itself and Microsoft Corp. Microsoft's interest definitely legitimizes the category; however, it also serves as a warning that market share — and de facto standards — are liable to shift in coming months. That's something information technology managers should be watching.

But DataSage has strong allies, including Sun Microsystems Inc., Hewlett-Packard Co. and Oracle Corp. If it can deliver on its individualization promises, chances are good it will remain a player in this market for some time to come. ◗



BETH SCHECKENBURGER

DATASAGE'S software handles data using algorithms built by CEO David Blundin

DataSage Inc.

Location: 19 Newcrossing Road Reading, Mass., 01867

Telephone: (800) 304-9216; (781) 942-3600

Web site: *www.datasage.com*

Niche: E-commerce personalization tools

Why it's worth watching: DataSage combines online and off-line customer data to build a complete picture of the customer's needs and likely buying habits.

Company officers:
- David Blundin, founder and CEO
- John Lunny, vice president, engineering
- David Ellenberger, president and chief operating officer

Founded: 1997

Burn money: OneLiberty Ventures, Advanced Technology Ventures, Sigma Partners

Technology partners: Oracle, Informix Corp., NCR Corp., Thinking Machines Corp., net.Genesis, SPSS Inc., Sun, Hewlett-Packard, Data General Corp., Compaq Computer Corp., Accrue Software Inc.

Product/pricing: NetCustomer/ Licenses start at $75,000

Customers: Cyberian Outpost Inc. (*www.outpost.com*), AdKnowledge Inc. (*www.adknowledge.com*), Harbor Freight Tools Inc. (*www.harborfreight.com*), Sears Hardware Centers (*www.sears.com/craftsman*)

Red flags for IT:
- DataSage is a relative newcomer in a field of newcomers; its first real product shipped last month. While the company has impressive buy-ins and good technology partnerships, it also has stiff competition – especially with Microsoft showing signs of getting into the game.
- While combining online and off-line customer data is a great idea, actually bringing diverse data streams together in a format that can be mined is a Herculean task.

COMPUTERWORLD emerging companies

[the buzz]
STATE OF THE MARKET

Data Mining for E-Biz Treasure

Many of the top names in personalization software are emerging companies themselves, and several have been featured in past profiles. Here's a short list of our favorites:

Art Technology Group Inc.
www.atg.com
Product: Dynamo Personalization System
Customer: Garden.com
Platforms: Windows NT, Solaris, AIX
Databases: Sybase, Oracle, Microsoft SQL Server

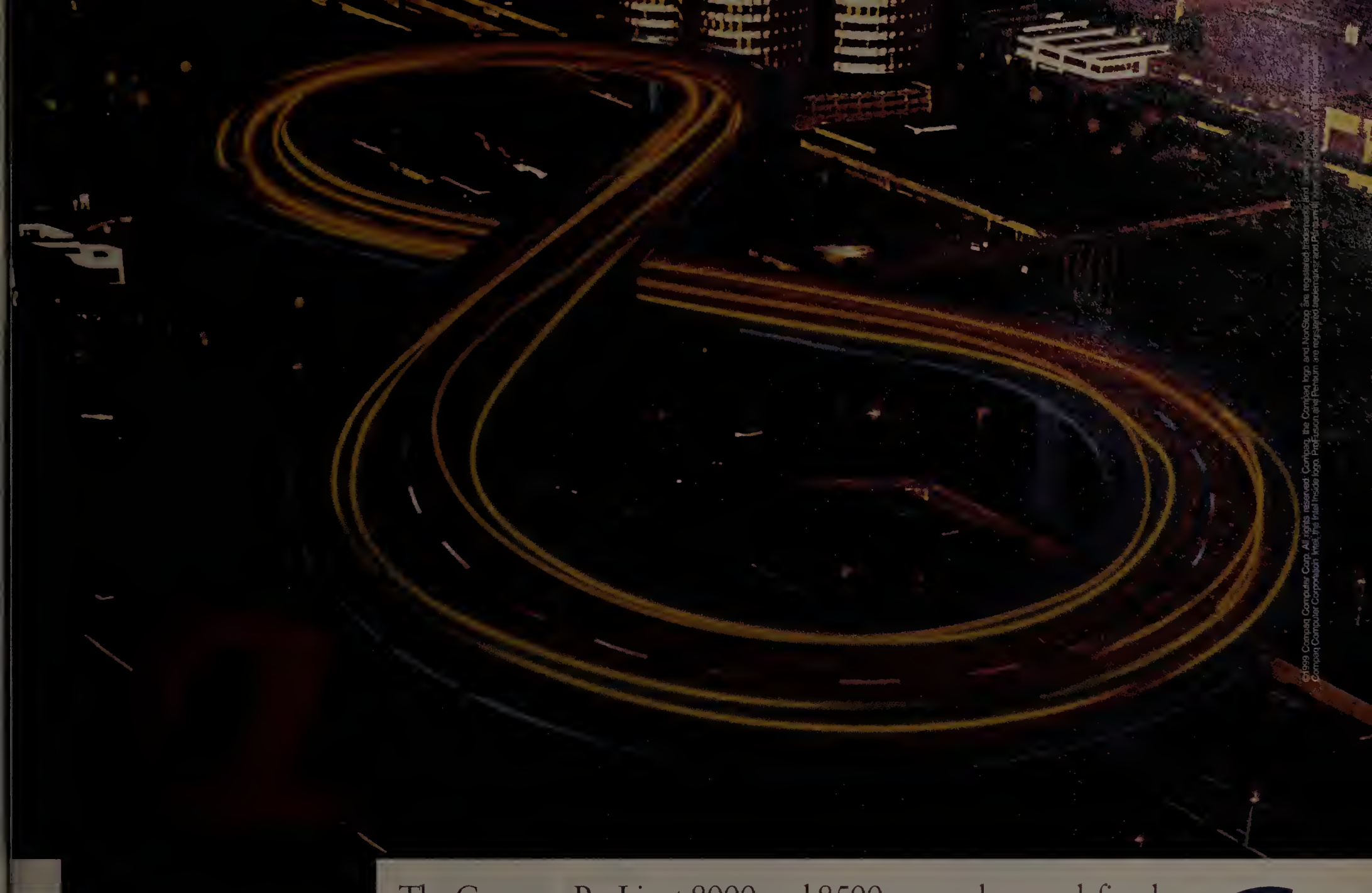
Blue Martini Software Inc.
Product: E-Merchandising System
Customer: Levi Strauss & Co. (*www.levi.com*)
Platforms: Windows NT, Solaris
Databases: Microsoft SQL Server, Oracle

Broadvision Inc.
www.broadvision.com
Product: Broadvision One-to-One
Customers: HP Shopping Village (*www.shopping.hp.com*)
Platforms: Windows NT, Solaris, HP-UX
Databases: Oracle, Informix Corp., Microsoft SQL Server, Sybase

Manna Networks Inc.
www.mannainc.com
Product: FrontMind for Marketing
Customer: Streamline Inc. (*www.streamline.com*)
Platforms: NT, Solaris
Databases: Microsoft SQL Server, Oracle7 or higher

Net Perceptions Inc.
www.netperceptions.com
Product: Recommendation Engine
Customer: Bluefly Inc. (www.bluefly.com)
Platforms: Windows NT, Solaris
Databases: Microsoft SQL Server, Oracle

Personify Inc.
www.personify.com
Product: Personify Essentials, Personify Proactive
Customer: Volvo AB (*www.volvo.com*)
Platforms: Windows NT, Solaris
Databases: InterSystems Cache, Microsoft SQL Server, Oracle8



How can my business race ahead on the 8-way highway?

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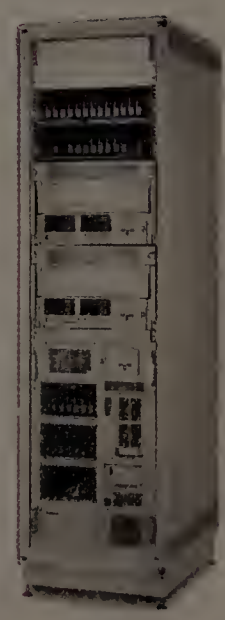
intel inside pentium® III xeon™



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Scanner Smorgasbord

VISIONEER ONETOUCH 7600 can scan documents of all sizes

BY DAVID STROM

SCANNING TECHNOLOGY has reached the point of being useful for every corporate worker. A few years ago, scanners were expensive and fussy units used strictly by graphic arts professionals. But today, even an inexperienced computer user can deliver high-quality scans with a minimum of hassle.

Scanners are a great way to take printed illustrations such as documents or pictures and convert them into an electronic format to be used for your corporate Web site or contact database. However, there are many kinds of documents and many ways to scan them.

First, you must decide whether you want simply to make an electronic copy of the document or whether you want to convert it, using optical character recognition (OCR) technology, into text you can work with in a word processor or other application.

Next, you should look at the various features, including resolution; whether the scanner can handle colors or just black and white images; and how the scanner connects to your PC. The most important criterion is the resolution of the device: The higher the resolution, the more accurate your scan.

Finally, you need to choose a scanner to match your needs. They fall into four very different categories:

- General scanners handle the widest range of documents, from single sheets of paper to pages in a book. Flatbed scanners are the most versatile. They are similar to a copier: You open the lid, place your document on the glass shelf and proceed to do your scans.
- Document or sheet feeder scanners are best for jobs that involve multiple but similar-size pages, such as printed reports.
- Business card scanners are used only for that purpose and come with dedicated card-scanning software. I tested CardScan, from Corex Technologies Corp. in Cambridge, Mass., and it worked well.
- Portable scanners are useful for doing some scanning on the road away from your desktop and saving documents for later filing or manipulation. ◗

CARDSCAN EXECUTIVE has modules that can synchronize its database with various personal information managers, including CEs and Palm devices

OneTouch 7600

Visioneer Inc.
www.visioneer.com
$149.99

Visioneer has a full line of scanners, and the 7600 flatbed is a workhorse of a unit.

The unit hooked up to my PC's parallel port. It took about five minutes to install it and configure the software. But once you start scanning, be prepared to have lots of disk space on hand because high-resolution, full-color scans can take up several megabytes per page. Scanning is easy to do, and documents can be quickly previewed and filed on your hard disk, as well as saved in a variety of standard image formats such as Tag Image File Format (TIFF), JPEG and PCX.

Visioneer uses the Textbridge OCR software to interpret scanned text. It's about 98% accurate and easy to use. Overall, it's a good value as an all-purpose scanner and is useful in a variety of applications.

CapShare 910

Hewlett-Packard Co.
www.capshare.hp.com
$699

The HP CapShare device was designed to be portable for scanning on the road. It's best for copying newspaper articles or other multiple-column documents, because its scanner is less than 5 inches wide. It has a small LCD screen and a series of buttons on each side. It connects to your PC via a serial or an infrared port and runs on two AA rechargeable batteries. It can hold about 50 pages of letter-size text.

It produces files in either TIFF or Portable Document Format. It doesn't have recognition software built in. Getting it to work with my HP Windows CE palmtop took a quick search of HP's Web site for instructions. Transferring and viewing the scanned files on a Windows 98 PC was simple, using Adobe Systems Inc.'s Acrobat viewer.

CardScan 300

Corex Technologies Corp.
www.cardscan.com
$299

Corex CardScan was designed exclusively for scanning business cards into your computer. This small box connects to your PC via a parallel port and runs on AC power.

Its software installs in a few minutes. Once the scanner is calibrated, you feed in business cards one by one. The software then reads the data on each card and attempts to organize the information in its database, matching phone and fax numbers and other fields with the information on each card.

The recognition software was about 90% accurate, and almost every card needed some tweaking or editing after the scan. Still, this was easier than typing in all the information from scratch.

WordWand

WordWand
www.wordwand.com
$99.95 to $199.95, depending on features

Perhaps the most interesting scanner of the bunch is the WordWand, a portable text scanner that's the size of a gun stock with a small scanner window on the bottom.

You scan by passing the device over a line of text at a time, going from right to left so you can see where to point it. As with the CardScan unit, if your materials contain mixed font sizes, colored text and other graphics, it will be harder to interpret the text. I found the most recent recognition software to be about 95% accurate.

This scanner is only for taking text from a page and placing it inside an open document. About the only tricky step is to first bring up its software and then start whatever word processing software you want to use to receive the text.

■ *Strom is a freelance reviewer in Port Washington, N.Y.*

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Internet Protocol Security

BY ANN HARRISON

WHILE THE Internet is inherently insecure, businesses still need to preserve the privacy of data as it travels over the network. To help do that, the Internet Engineering Task Force — an international group of network designers, operators, vendors and researchers concerned with the evolution of Internet architecture — has developed a suite of protocols called Internet Protocol Security (IPsec).

IPsec creates a standard platform to develop secure networks and electronic tunnels between two machines. Secure tunneling via IPsec creates circuitlike connections in a network through which data packets can move. It creates these tunnels between remote users and within a local network. It also encapsulates each data packet in a new packet that contains the information necessary to set up, maintain and tear down the tunnel when it's no longer needed.

Encryption is used to ensure the confidentiality, integrity and authenticity of the two end points in the private network. The Internet Key Exchange (IKE), an application-layer protocol, authenticates each peer in an IPsec transaction. IKE negotiates security policy, determining which algorithm may be used to set up the tunnel. It also handles the exchange of session keys used for that one transaction.

Networks that use IPsec to secure data traffic can automatically authenticate devices by using digital certificates, which verify the identities of the two users who are sending information back and forth. IPsec can be an ideal way to secure data in large networks that require secure connections among many devices.

Users deploying IPsec can secure their network infrastructure without affecting the applications on individual computers. The protocol suite is available as a software-only upgrade to the network infrastructure. This allows security to be implemented without costly changes to each computer. Most important, IPsec allows interoperability among different network devices, PCs and other computing systems.

Will Wilgus, CEO of Slocum & Spray, a security consultancy in Ardsley, N.Y., says that, as with any encryption system, information technology managers must evaluate IPsec on its technical strengths and determine how well it fits into their organizations. He says IT managers must also evaluate the protocols used within their organizations, such as user identification and key management. In addition, he says, managers should look at the algorithms used with IPsec and provisions for message integrity and sender authentication.

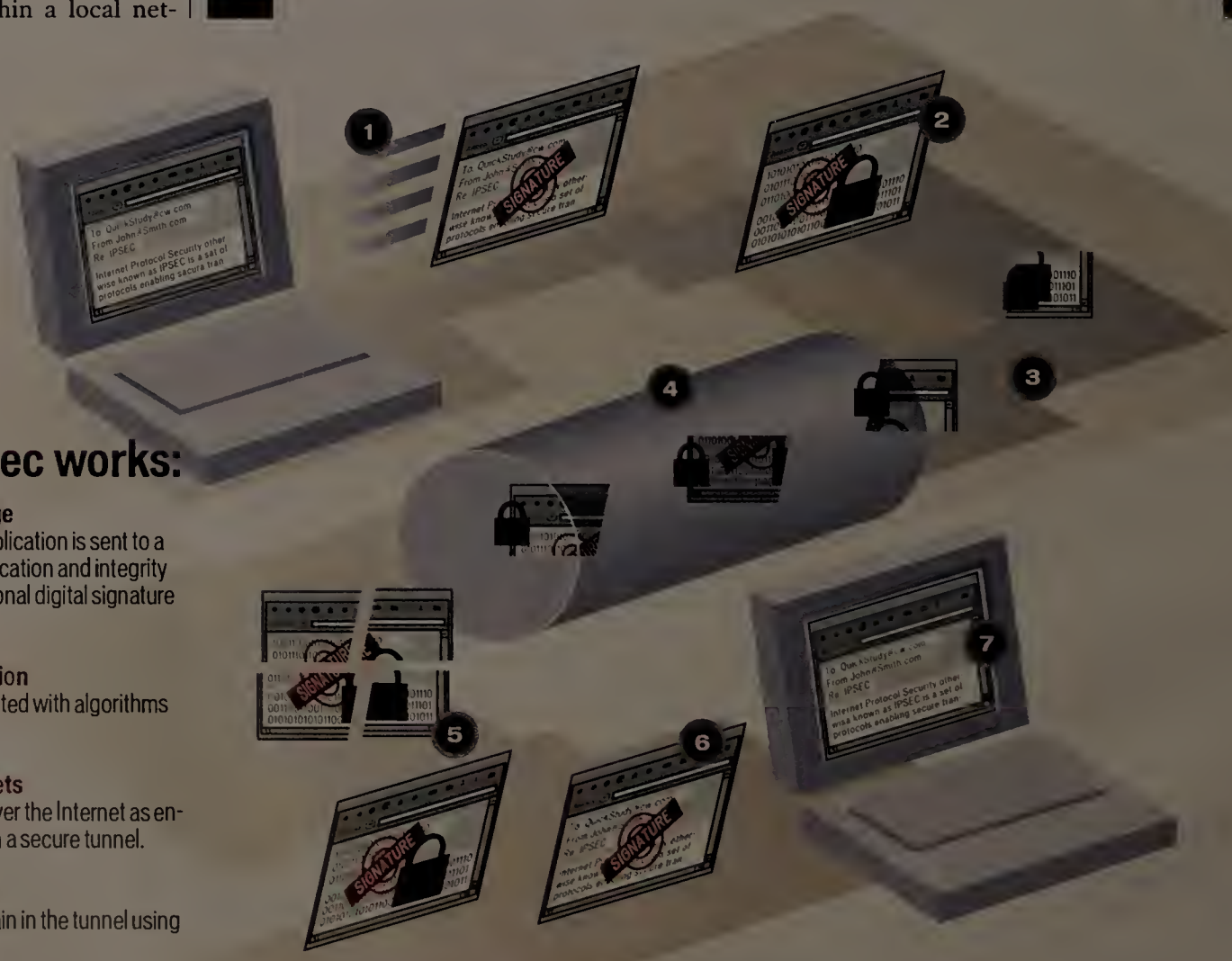
IPsec is also useful when setting up remote users. These workers can use an IPsec client on their PCs in combination with other secure tunneling protocols such, as Layer 2 Tunneling Protocol, to connect back to the network. This reduces the cost of remote access and offers greater security than is possible over dial-up lines.

The International Computer Security Association (ICSA) in Reston, Va., is running IPsec interoperability tests for an extranet project of the Automotive Industry Association Action Group's Automotive Network Exchange. The ICSA (*www.icsa.net*) posted a list of IPsec-compatible products that meet its interoperability specifications.

Wilgus warns that IPsec alone isn't enough. "Simply because it will be a standard, merely using IPsec-compliant software will not solve your security problems," he says.

DEFINITION

Internet Protocol Security (IPsec) is a suite of protocols used for secure private communications over the Internet. The proposed suite of IPsec protocols would create a standard platform for securing IP connections on private networks.



How IPsec works:

① Send message
Data within an application is sent to a message authentication and integrity function with optional digital signature provision.

② Data encryption
The data is encrypted with algorithms using a public key.

③ Secure packets
The data is sent over the Internet as encrypted packets in a secure tunnel.

④ Session key
It is encrypted again in the tunnel using a session key.

⑤ Data decryption
At the end of the tunnel, it is decrypted using a private key.

⑥ Verification
When the data hits the receiver's PC, it is checked and the sender is verified using a message integrity function and an authentication provision.

⑦ Message received
The receiver can now read the text.

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Making Connections With Enterprise Knowledge Portals

IDC
INTERNATIONAL DATA CORPORATION

MAKING CONNECTIONS WITH ENTERPRISE KNOWLEDGE PORTALs

By Gerry Murray IDC

Portals are everywhere. Internet portals have set new benchmarks for ease of use, branding, and market capital. They have created a higher expectation among corporate users for internal information access, demonstrated a lower cost of ownership model to IT, and inspired vendors of every stripe to introduce their version of the "enterprise knowledge portal (EKP)." This raises the questions of how do EKPs differ from consumer portals, and even more importantly, how will they evolve?

There are substantial differences between a consumer portal and an EKP. They serve two completely different audiences for completely different purposes. More specifically, key functional characteristics differentiate EKPs from consumers portals. The primary differences between the two are illustrated in Table 1.

The key concept here is that the EKP is completely different from the consumer portal. It will eventually provide prioritized user access to all relevant content, colleagues, and capabilities. This access should be the long-term objective of anyone charged with building an intranet portal.

Why are EKPs needed? Corporate intranets have generally failed as vehicles for content aggregation and organizational coordination, largely because initial deployments dealt only with infrastructure and authoring capabilities. At some companies, information and expertise are actually more fragmented on the corporate intranet(s) than they were in the client-server architecture. EKPs apply the integration and administration capabilities necessary to fulfill the original intention of all those intranet investments.

Benefits

EKPs address several critical economic imperatives by

- Automatically re-purposing best solutions, policies and practices
- Creating more responsive organizations through networking expertise
- Efficiently cross-pollinating ideas and expediting innovation.
- Enabling central deployment and administration of thousands of personalized desktops.

Architecture

The architectural model that IDC uses to describe how the client-server world translates into a Web-based model is depicted in Figure 1. The full-blown EKP extends into all the content repositories; provides unified indexing and taxonomy; audits usage and updates user profiles; and enables IT to build a series of secure templates and components for access and analysis. Line of business managers can then use this data to create desktops for different job categories.

Gerry Murray is the Director of Knowledge Management research at International Data Corp., an IT market research and consulting firm with more than 500 analysts in 42 countries. He has just completed a six-month evaluation of the knowledge management market and published his findings in a 275-page report titled Sourcebook for Knowledge Superconductivity. He provides market insight to product and service vendors, systems integrators, VARs and investment firms. He can be reached via e-mail at: gmurray@idc.com.

Table 1 Consumer Portals Versus Intranet Portals

Function	Consumer Portals	Enterprise Portals	
Content access	Web sites	*All consumer content plus:*	
		Corporate intranets	E-mail repositories
		Database/data warehouse	File servers
		Directories	Image/fax repositories
		Document repositories	Mainframe/COLD reports
		EDI	
Function	**Consumer Portals**	**Enterprise Portals**	
Capabilities	Calendaring/scheduling	*All consumer capabilities plus:*	
	Chat/conferencing	Access to ERP/transaction	Forms processing
	Distance learning	processing	Groupware
	E-mail	Decision support tools	Personal productivity tools
	Media streaming	Document management	Terminal emulation
	Pager alerts	Federated text/data search	Workflow routing
	Personalization		
	Search		
Function		**Enterprise Portals**	
Unique EKP portal value add		Adaptive push	Expertise networking
		Administration	Load balancing
		Automated inferencing	Metadata management
		Classification	Single sign-on
		Contextualization	Taxonomy management
		Dynamic user profiling	

Source: International Data Corporation, 1999

This White Paper has been excerpted from IDC's evaluation of more than 40 knowledge management (KM) product and service providers and their customers. The findings of this research is available in a 40-page excerpt that differentiates KM product and service categories; segments types of corporate portals; examines the technical and organizational implications of knowledge sharing; and illustrates the path from traditional IT approaches to knowledge-oriented systems. Copies of the report can be ordered by calling (508) 935-4219.

Applications

Today, the more successful users are deploying one or more functionally oriented portals to pull together multiple content repositories for a homogenous group of users. Table 2 lists leading applications for EKPs.

Implementation

Successful EKP implementations require joint planning, development, and administration efforts between IT and business managers. EKP strategies should be fully mapped out in terms of the short- and long-term business objectives, as these determine how structured, unstructured, and people-based information can be integrated under an acceptable security schema.

Table 2 Applications for EKPs

Internet	Extranet
Customer service	Business to business e-commerce
Help desk	Supply chain
Competitive intelligence	IT outsourcing
Legal/intellectual property	
Sales force	
R&D	
Web-based training	
HR	

Source: International Data Corporation, 1999

Structured Data

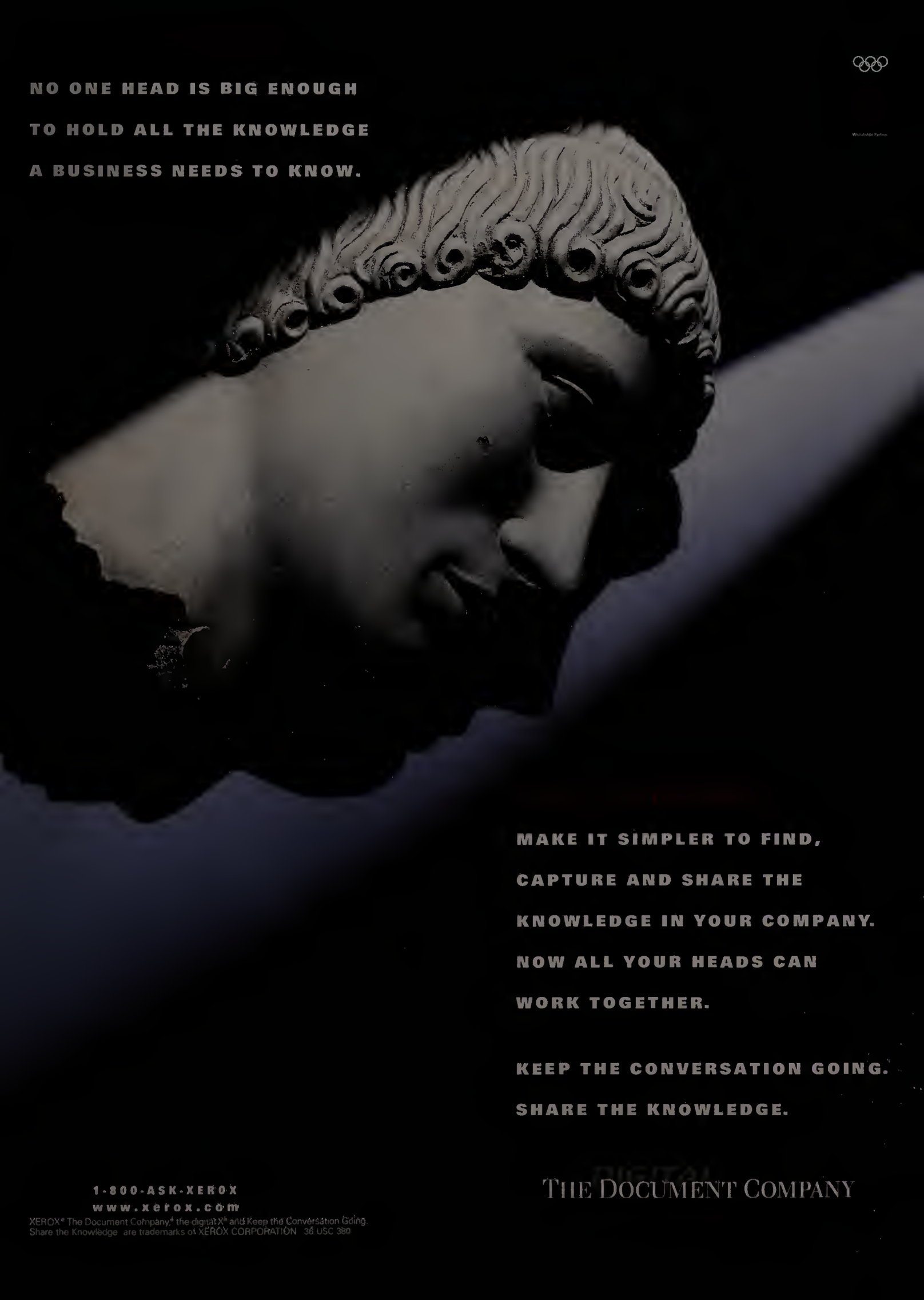
Data marts or metadata indexes will normally be required so that operational systems are not directly exposed to thousands of new users, and so that logical data structures can be recast in business terms for business users. The better portal vendors offer good APIs and compliance with ODBC, SQL, XML and other standards to ease this process.

Unstructured Information

A complete EKP solution will provide the natural language support, Web crawlers, full text indexing, taxonomy administration, metadata management, etc. necessary for handling large volumes of multi-format text-based information. In particular, e-mail systems must evolve security schema so that messages can be accessed categorically and yet maintain individual privacy rights.

Paper Documents

Organizations continue to receive critical information in paper form and unless this content is included in EKP design, the solution may fall short. Fortunately, network scanning capabilities are being added to office copier/printers, and network scanning software is available to integrate digitized documents with existing document management and messaging platforms.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Paper conversion services will benefit from categorization engines that can match results from optical character recognition (OCR) routines with the corporate taxonomy and tag incoming documents. The document management software that controls access, check-in/out and versioning can then be integrated at the desktop by the EKP.

Integration

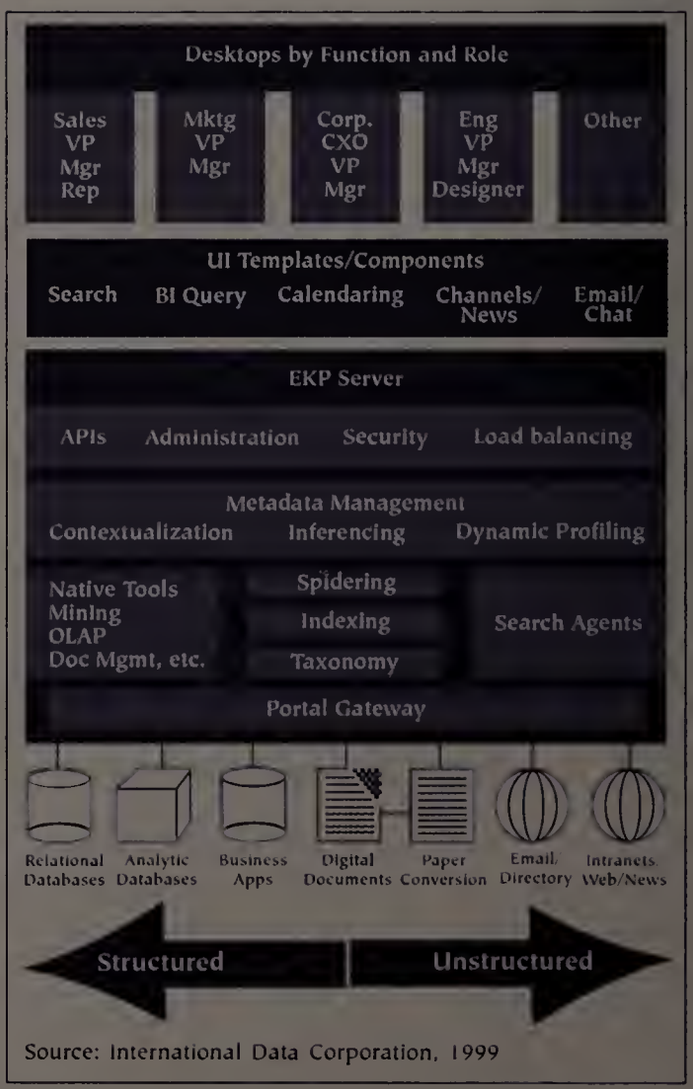
Integration requirements will vary depending on the state of existing systems and the degree of existing Internet integration. Most integration efforts that IDC has seen deal with moving mission-critical applications to HTML or XML, from which most data can easily be incorporated into an EKP. Middleware capabilities are occasionally required, especially as the scope of the information access expands across departmental systems with proprietary data formats and multiple platforms.

Security

Single sign-on is critical for user acceptance. With log-on pass-through, security can be controlled by DBAs using existing access control tables established for pertinent databases. As the EKP expands across functional and regional boundaries, security can also be implemented at the portal level by line of business managers.

EKPs and the Desktop

In the long run, we will visit EKPs daily to get our work done. EKP desktops will be far more efficient and easy to use than anything the client-server world had to offer. This is especially true for senior management, sales, marketing, research and development personnel, etc.—in other words, knowledge workers. If you believe that competition in your industry will be defined by how well your company creates, captures, retains, refines, and re-purposes knowledge throughout its supply chain, then you can't afford to let your competition go live with a full-scale EKP before you.



Source: International Data Corporation, 1999

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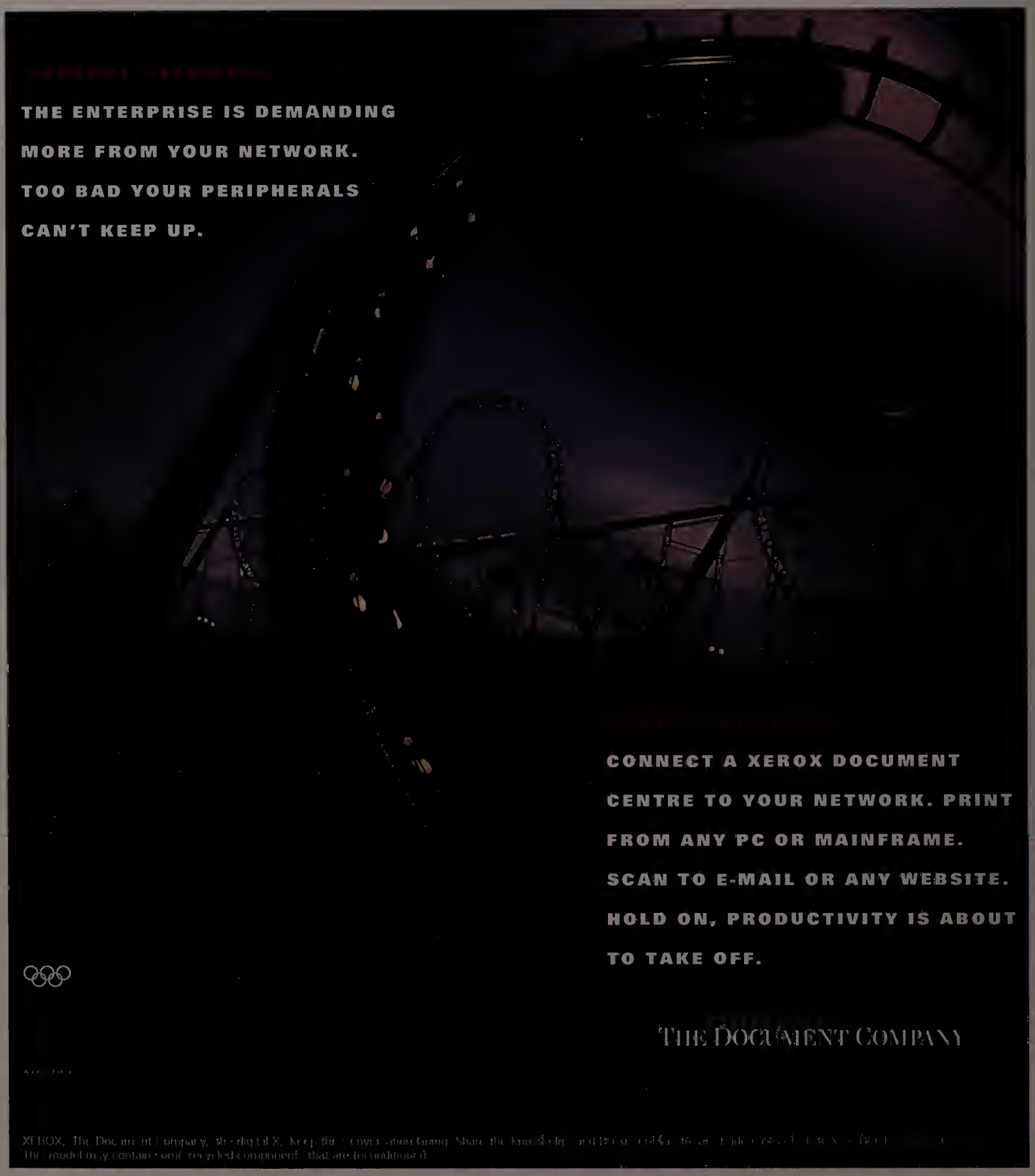

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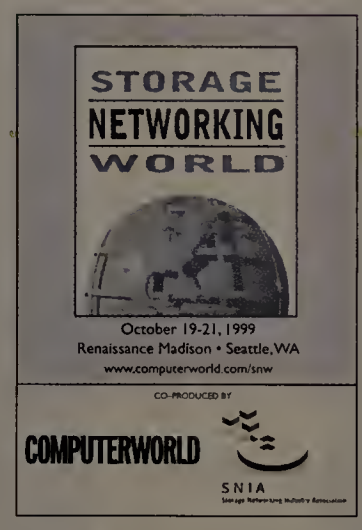

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LINUX IN A 3-PIECE SUIT?

REX RYSTEDT

BILL CAMPBELL, Archive Retrieval Systems

JAMES MCGOON

JEFF DAVIS, Amerada Hess

MIKE PRINCE, Burlington Coat Factory

Though few companies are ready to make Linux a corporate standard, a small number of large organizations are using it to do serious work

By Barry Nance

AN OPERATING SYSTEM at no charge. In the cost-conscious world of enterprise business automation, you'd think a free or nearly free operating system might be a really attractive proposition. But the situation is more complex than you might think and, unfortunately for open-source advocates, the answer often doesn't point to Linux. However, a few enterprising organizations are piloting the use of Linux, and some are already using it for critical run-the-business applications.

Enterprises giving Linux a try include Amerada Hess Corp., Burlington Coat Factory, Cendant Corp., The BFGoodrich Co., the *Los Angeles Times* and the city of Medina, Wash. For these organizations, the chance to save money is important.

Characteristics such as high performance and reliability are also high on the list of Linux attractions. To achieve these, people are deliberately going outside their comfort zones to expose themselves to different ways of thinking about operating system purchases, installation and support.

In a recently released International Data Corp. (IDC) study of 780 non-information technology (business) managers, 77 said they planned to explore the use of Linux or use it as a business-automation platform. The previous year's study had only 14 such responses. Dan Kusnetsky, an analyst at IDC, says about 30 of those respondents planning to look at Linux are at large organizations. However, Kusnetsky also indicated that Linux is finding its way mostly into research, scientific, engineering and Internet-oriented companies. In large organizations, Linux is still fairly rare.

The reasons for and against using Linux in an enterprise are many. On the one hand, it's inexpensive, and for many applications, it runs more efficiently than other operating systems, which makes it possible to use less expensive hardware. Linux is also based on open standards and thus is highly vendor-neutral. On the other hand, Linux has almost no track record as a serious business platform, and its ongoing administrative costs will be pretty much the same as those of any other Unix-like system. And adopting Linux will require that you give some additional training to administrators, developers and users who are already well-versed in Unix or Windows NT.

For some IT managers, an antipathy toward Microsoft Corp. makes Linux look like an attractive alternative. If that sounds like you, however, be careful about letting emotions — especially negative ones — affect your business decisions. Remember, it's not your job to keep Microsoft from conquering the world; instead, you need to conquer the world yourself, using whatever tools are right for the job.

Also, Linux's low initial price is only a small part of the total cost, and for many enterprises, that may not be a factor at all. Because the initial expenses of a system such as hardware acquisition, operating system licenses and development costs are amortized over the life of the system, minor savings at that point have relatively little effect on the overall cost/benefit picture. During a five- or 10-year period, it will be the ongoing operational costs and the actual benefits realized that determine the system's payback value.

The following profiles detail the experiences of four enterprises that considered Linux for their major systems. Three decided that Linux had important cost and efficiency advantages and opted to run with it; the fourth took a pass and chose Solaris.

SHAKING UP OIL EXPLORATION IT

For high-volume seismic calculations, clustered Linux workstations outperform more expensive systems.

ORGANIZATION: Amerada Hess Corp., New York
www.hess.com
ASSIGNMENT: Convert the company's 3-D seismological analysis application to run on a low-cost platform
OPERATING SYSTEM: Red Hat Software Inc.'s Linux
LEAD: Jeff Davis (jdavis@hess.com)

Like any integrated oil company, Amerada Hess Corp. lives and dies by the quality of its seismographic analysis. Its proprietary 3-D analysis software used to run on expensive AIX-based, IBM RS/6000 SP2 computers in the company's Houston offices. Now it runs on Linux, installed on 96 network-clustered Dell Computer Corp. workstation Model 410 machines. The 96 Linux nodes act in parallel across a Fast Ethernet LAN to calculate and graph millions of data points. Jeff Davis, senior systems programmer at Amerada Hess, says replacing the hardware and software saved 20 to 50 times the expense of the RS/6000s; he's pleased with the switch.

The 3-D seismographic analysis software, which was custom-written by Amerada Hess programmers, produces underground graphical models that start at the ocean floor and go down about 30,000 feet. Because the application was already Unix-based, porting the code to Linux took only about a week, Davis says. The company had projected that the programming effort and time needed to port the code to Windows NT would have been significantly greater, he says.

Moreover, his evaluations show that Linux has better remote administration tools and much better performance than Windows NT. The icing on the cake for Davis is that Linux requires less memory than NT to do the same job.

Customizing Windows NT for a single customer just doesn't happen, he says. However, having the source code for Linux means Amerada Hess could make slight modifications to the operating system to reduce its memory usage and increase its overall performance.

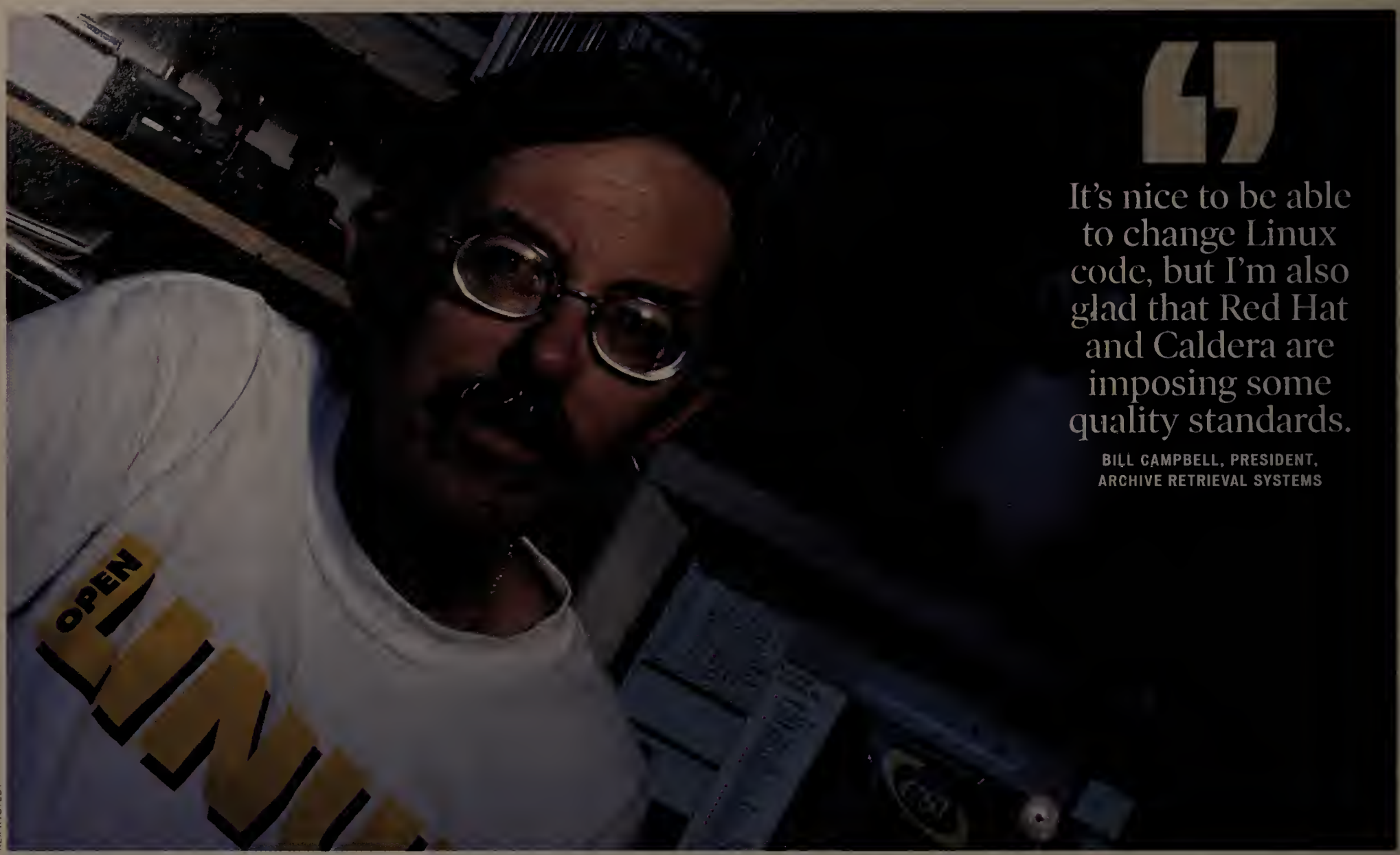
Streamlined System

For example, Davis says, the programmers changed the size of tape buffers and extracted unnecessary operating system modules from memory. The result is a streamlined platform on which the 3-D seismographic analysis software runs extremely well.

In addition, Davis says the cost of running the application on Linux is dramatically less — not only because the hardware is inexpensive but also because it's far easier to administer Linux than AIX. The familiarity and Unix-like nature of Linux made for few problems, Davis says, and he's especially happy that Red Hat supplies excellent software management utilities with its Linux distribution. Davis says the occasional Linux upgrade is a snap to perform, involving only a simple rebuild of the kernel and straightforward configuration of the operating system.

Davis acknowledges that the switch to Linux caused a few headaches but says they were quickly eliminat-

Continued on page 72



REX RYSTEDT

> It's nice to be able to change Linux code, but I'm also glad that Red Hat and Caldera are imposing some quality standards.
>
> BILL CAMPBELL, PRESIDENT, ARCHIVE RETRIEVAL SYSTEMS

LINUX IN A 3-PIECE SUIT?

Continued from page 71

ed. The biggest problem was intermittent connectivity errors with the cheap Ethernet adapters the company had bought for the Dell machines. Infrequent but maddening errors happened when Linux machines encountered difficulty with Ethernet switch negotiation. Replacing the Ethernet adapters with Intel Corp. and 3Com Corp. hardware and using different driver software cured the problem.

Davis says he likes being able to rely on the support of the Linux community for answers to his questions and to help solve his problems. He describes how he can e-mail a question to the author of an operating system component and feel confident that he will get an informed, direct reply. "Try getting a personal reply from the developers of any other operating system," he quips. For spelunking in the operating system's dimmer recesses, Davis also likes the diagnostic tools that come with Red Hat Linux.

The Amerada Hess Linux machines are more than calculation engines. Some of the Dell computers also act as file and print servers, via Network File System (NFS). In the future, Davis thinks Linux will subsume a number of other general functions within the company, including domain name serving and Web serving. Linux's mind share is growing within the company, Davis says, and it has opened management's eyes to new possibilities. Davis often hears questions such as, "Can application ABC also run on Linux?" or "Does Red Hat support doing XYZ on Linux?" The company currently uses four different Unix variants — AIX, IRIX, Solaris and Linux — but he foresees AIX and IRIX going away over time.

WRAPPING UP PRICE LOOKUP

Faster, cheaper price lookups via Linux help wrap up coat sales.

ORGANIZATION: Burlington Coat Factory, Burlington, N.J.
www.coat.com
ASSIGNMENT: Give local retail stores a low-cost, high-performance price-lookup application on a platform to which the company can easily add other applications
OPERATING SYSTEM: Red Hat Software Inc.'s Linux
LEAD: Mike Prince (mike.prince@coat.com)

Looking up the price of a coat or other apparel product is a common task at Burlington Coat Factory's 250 retail stores. To make the job quicker and less expensive, the company is in the process of converting the lookup automation from dumb terminals connected to Sun Microsystems Inc. SPARC-based machines running SunOS 4.1 to Dell PCs running Red Hat Linux. Mike Prince, the company's CIO, says Burlington's conversion involves installing Linux on 1,150 computers in its stores, an effort that won't be completed for another six to 12 months. The $1 million-plus project is the largest Linux retail installation announced by a U.S. company.

Burlington serves up most of the other applications in each store via browser-based Internet technology over a new frame-relay network, Prince says, and the Linux migration won't affect those applications. Similarly, the cash registers are older PCs running MS-DOS, a configuration Burlington intends to keep until it finds or builds a Linux-based option.

The clients for back-office and inventory applications are either radio-frequency handheld scanners or dumb terminals. The price lookup database itself is a keyed index file containing about 1 million records. Prince plans to replace the dumb terminals with Pentium-based PCs but hasn't yet decided whether to scrap the SPARC machines or install Linux on them. He says he believes that switching to Linux from SunOS 4.1 won't be as painful as it would be from a Windows environment. Although the first target application is price lookup, Burlington would like to deploy other Linux-based applications to each store.

Prince's plan initially uses Linux as a client, but later migrations will also use Linux in a server role. For example, Linux will supply printer-sharing services as well as NFS services to cash register PCs in each store. The server machines, which will likely

be identical to the client computers, will also perform end-of-day, in-store processing in addition to sharing printers and files. One of Prince's eventual goals is to have some load balancing within the company's larger outlets.

"We've encountered no real problems along the way except for the availability of Linux application software for what we want to do in the future," Prince muses. He says the conversion is going smoothly and has easily overcome the few connectivity and wiring problems that have cropped up.

Burlington's handheld radio frequency scanner vendor, Telxon Corp., gave Prince a momentary scare with the announcement that it would support only Windows NT and Solaris, but the vendor rethought its strategy and produced a Linux port of its software just in time for Burlington's rollout of Linux.

The in-store time and attendance application from IMB, a subsidiary of Gardner, Mass.-based Simplex, is a tougher nut to crack. Burlington runs the application on SunOS, but IMB plans to support only Windows NT in the future. Prince has no resolution to the problem as yet, and he's diligently looking for a Linux-based time-and-attendance application. He says a browser-based software product would suit him just fine.

IMAGING CITY HALL'S DOCS

Awash in paper, Bill Gates' hometown chooses Linux for a fix.

ORGANIZATION: City of Medina, Wash.
ASSIGNMENT: Computerize Medina's documents and records on an extremely tight budget
OPERATING SYSTEM: Caldera Systems Inc.'s OpenLinux
LEAD: Bill Campbell, president of Archive Retrieval Systems Inc.

Like most city halls across the nation, the government of Medina, Wash., is quietly drowning in paper. Its tight budget for capital improvements is also typical. Medina (boyhood home of Microsoft's Bill Gates) couldn't afford a document management system costing $75,000 and upward. Instead, it chose to automate the storage of city records, which includes anything in a City Hall file cabinet, with a Linux-based system costing about $27,000.

The city contracted with Archive Retrieval Systems Inc., headed by President Bill Campbell, to install and configure the document management system. In July it went into production, and Campbell says the city is already realizing considerable savings.

The document imaging system is the only application running on Linux now, but the city plans to use Linux for file and print serving in the not-too-distant future. Eventually, the same Linux machines will also handle Internet Protocol routing, IP address assigning and e-mail serving.

The new system scans paper records and stores the results on write-once CD-ROM disks. A Linux server holds the digital documents, while a Linux client manages the image scanning device. Campbell says the scanning device client initially ran on an Intel version of Solaris, but software vendor ViviData Inc. was able to port its scanning utility to Linux in a week instead of its projected six to eight weeks of development time. Campbell says the system runs almost twice as fast on Linux. He adds that it's now more robust and easier to configure.

Persuading ViviData to port its software to Linux was his biggest problem, Campbell says. Minor problems have included some glitches between Linux and the hardware, such as occasional errors in Linux's management of the document-feeder unit. Campbell says he went into the Linux source code and fixed the problem himself.

Campbell says he appreciates the speed, size and reliability of Linux, but he hastens to add that a "university mind-set" regarding changes to the operating system is a risk that Linux users face every day. He says he believes value-added resellers and other vendors should shield customers from the vagaries of multiple, geographically dispersed programmers making changes to the operating system. Businesses shouldn't be subject to a lack of programming consistency and quality, and he's glad Red Hat and Caldera are imposing some standards of quality on Linux, he says.

Campbell says he can easily imagine how problems might creep into Linux, given its community-based heritage. However, he says he fails to see how a team of Microsoft programmers could produce an operating system for which each new service pack causes headaches and unexpected behaviors that users can neither fix themselves nor easily work around.

NOT WORTH THE RISK

For a new financial application, Thompson picks the safe route.

ORGANIZATION: Intelligence Data Inc. (part of Thomson Financial), Boston
www.intelliscope.com
ASSIGNMENT: Choose a reliable, robust and responsive operating system for a new financial services application
OPERATING SYSTEM: Solaris 2.6
LEAD: Sean McRae (sean.mcrae@tfn.com)

Linux appeared briefly on the mental radar screen of Sean McRae, chief technical officer at Thomson Financial, when he was assigned the job of developing a financial services application that combined functions previously handled by several older applications. After weighing the pros and cons of Linux as a platform for the new application, McRae dropped it from further consideration.

He initially considered Linux because of its low cost and the IT community's growing awareness of Linux's ability for running business applications. In the end, however, he says he selected Solaris because he has chosen Sun Microsystems hardware and feels that Solaris is relatively inexpensive in relation to the cost of Sun's computers. He says he also suspects Solaris is a better platform for applications running on Sun's computers than Linux.

Support, Training Are Key

McRae sees Windows NT and Solaris as the application platform of market leaders right now. Linux support, from McRae's perspective, is just emerging. He's conservative enough to want to see a longer track record before he relies on Linux's new support paradigm. Training is also an issue, he says, as is getting adequate professional services to build and maintain a substantial business application.

"For just a few Sun computers, Solaris is an easy choice. I'd take a harder look at Linux if I were buying 50 or 100 servers, especially if the hardware was other than Sun's," McRae says. Looking at Linux in the future might make sense, he says, but right now he realizes that he can easily take advantage of people within Thomson Financial who are intimately familiar with Solaris.

McRae summarizes his decision this way: "Bringing a new application into the world entails a number of risks, and Intelligence Data was unwilling to take on the additional risk — no matter how small — of choosing Linux as an application platform."

Nance, a software developer and consultant for 29 years, is the author of Introduction to Networking, 4th Edition *(Que, 1997) and* Client/Server LAN Programming *(Que, 1994). You can e-mail him at barryn@erols.com.*

Thanks, Microsoft!

Dan Kusnetsky, an analyst at IDC in Naples, Fla., says he likes Linux but doesn't feel that it will pervade corporate America any time soon.

Ironically, however, he says he believes Microsoft is responsible for much of Linux's success. Because Microsoft has done such a good job of convincing people that 10, 20 or more inexpensive PCs can collaborate as functional servers to do the work of a single Sun minicomputer, using Linux in that same multiple-server environment becomes an approach one might contemplate, he says. "NT can't scale as well as Linux and lacks good clustering [fail-over] support," he asserts.

This lends credence to the use of Linux in roles that Windows NT would otherwise occupy, such as an Oracle database server. Nonetheless, Kusnetsky says, people's perceptions of Linux will largely limit it to peripheral roles in enterprises, where it's likely to be introduced by Linux advocates and gurus.

"That might change," he reflects, "if PeopleSoft Inc. or SAP AG were to release a Linux version of their software." Why did Oracle Corp. port its database software to Linux? Kusnetsky says it was good public relations for Oracle and was triggered initially by programmers in the company who may have ported some of the code on their own as an exercise. In addition, he says that Oracle should run on every operating system – it's a fundamental tool that should be completely platform-neutral.

Kusnetsky's research shows that most people who have put Linux to work in a business aren't taking advantage of its multitasking abilities. For instance, they're generally using Linux as a single-purpose file, print or Web server when it could be playing a greater role.

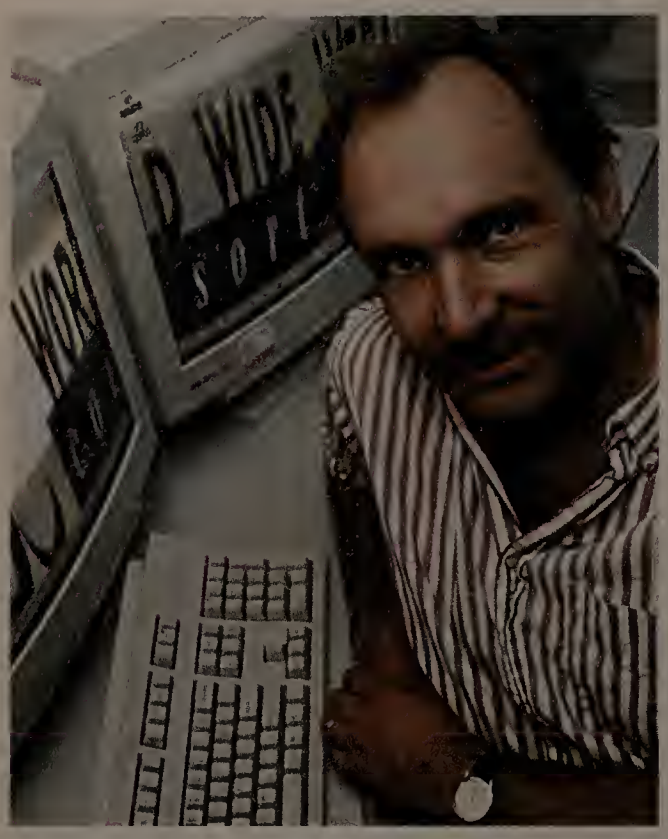
He says he rarely sees Linux used as a client, primarily because there are virtually no productivity applications written for it. And there's no percentage in emulation, either. Running Windows applications in a pseudo-Windows environment on Linux will give a person just a click and a dial tone when he calls a software vendor for support and mentions Linux.

Software and hardware costs typically make up only about 15% of the expenses for a vertical market application, Kusnetsky says. Staffing accounts for 50% or more of those expenses. "Saving money by getting a low-cost operating system may actually cost more in the long run," he says. Support and training costs are the real issue.

Because it's small, fast, reliable and Unix-like, Kusnetsky says, Linux's strength will be in transaction processing and other server-based tasks. Highly vertical applications might be appropriate for Linux, he says, particularly if they require a great deal of computing power and the user is on a tight budget.

Finally, Kusnetsky says that people who adopt Linux need to change the way they think about support. "You need to be able to work with the Linux community," he says, "and some people may not be comfortable with that."

– Barry Nance



If [Tim Berners-Lee, shown above] shakes his head yes, somebody can lose $1 billion, but if he shakes his head no, somebody *else* loses $1 billion.

CARL CARGILL,
DIRECTOR OF STANDARDS,
SUN MICROSYSTEMS INC.

DINING ON ROAST VEAL one evening, Internet pioneer Vinton Cerf and his wife were discussing cattle drives of the mid-19th century. What happened to legendary routes like the Chisholm Trail, they wondered.

Cerf's house is equipped with a radio LAN, so he was able to connect to the Internet via a wireless laptop computer at the dinner table. "Within a few queries, we got a wonderful dissertation with pictures and maps and histories of the trails," he says. "I thought, 'My God, the world's knowledge is just sitting there.' What's our culture going to be like when you can find out literally anything in a few seconds, when the brilliance of every human being is suddenly available to you?"

Cerf's vision isn't so far-fetched. And if that vision is to be realized, there's little doubt that the World Wide Web Consortium (W3C) will be a major driving force. Technical specifications developed by the W3C — most notably Extensible Markup Language (XML) -- are morphing the Web into a second-generation architecture, one likely to eclipse even the phenomenal success of the Web in the 1990s.

But despite nearly universal praise for its work, the W3C draws some criticism for its methods and concentration of power at the top --- in the person of Tim Berners-Lee, creator of the Web and founder and director of the W3C.

Nevertheless, even those who don't fancy the W3C's operating philosophy acknowledge that its agility is rare in a standards group and that its specifications bear a "moral majesty."

Semantic Web

The W3C is mapping out technology to support a "semantic Web," in which all the world's knowledge becomes computer-accessible. "Querying a database is not exciting," Berners-Lee says. "But querying a database that gets linked so as to query the whole planet is *very* exciting."

The W3C, based at MIT and research centers in France and Japan, last year took a giant step toward that goal by publishing XML. It can describe Web pages with far more power than Hypertext Markup Language (HTML), the Internet programming language developed by Berners-Lee in 1990 at CERN, the European Laboratory for Particle Physics in Switzerland. Unlike HTML, which describes the structure of a page, XML allows developers to make up their own tags, or metadata, to describe information content on the page.

The W3C is also working on the Resource Description Framework (RDF), a language that uses XML to enable application and content developers in different domains to share vocabularies — their own metadata — in ways that allow them to link diverse databases.

XML and RDF promise to make the Web much more powerful by enabling search engines to "understand" the meaning of information. No more getting a million hits on topics you don't care about, while missing information you want because it doesn't happen to include the keywords you specified.

Closing the Gap

The Web has propelled the Internet to 60 million nodes in the past five years, according to Scott Bradner, a senior technical consultant at Harvard University and an area director at the Internet Engineering Task Force (IETF). "The Web filled a hole we didn't know we had; we geeks were doing just fine," he says. "The W3C deserves an awful lot of the credit for that."

The W3C also fills a hole left by the older IETF standards body. Bradner says the groups jointly decided several years ago that the IETF would handle low-level topics such as the Web protocol HTTP — "how the bits flow across the wire" — while the W3C takes on issues closer to the application. "They are upper-middleware, and we are lower-middleware and below or, as someone put it, underware," he says.

But the groups differ in other ways as well. In fact, the W3C doesn't consider itself a standards body at all, preferring to think of itself as a research and development organization, a kind of techno-think tank. It develops open-source software for demonstration purposes or when it feels the marketplace isn't meeting a critical need.

For example, the W3C developed the first Web browser/editor combination called Amaya and a flexible and extensible Java-based Web server called Jigsaw. Anyone — even nonmembers — wishing to use, improve or build a product around Amaya or Jigsaw can download the source code at the group's Web site (*www.w3.org*).

Out of the Loop

The IETF, which doesn't develop software, is a loosely structured, grassroots-like group from which standards bubble up after being shaped and critiqued by anyone who cares to participate. The W3C is a more structured, less open coalition of 339 software vendors, large user companies and others who pay $5,000 or $50,000 (depending on size) in annual dues and sign an agreement vesting final decision-making authority in Berners-Lee.

But some people aren't entirely happy with that arrangement. MCI WorldCom Inc. withdrew from the W3C after two years when it concluded that membership wasn't worth $50,000 per year. "The structure of the W3C didn't lend itself to quite the degree of freedom to contribute that the IETF does," says Cerf, MCI's senior vice president for Internet architecture. "We found it difficult to get points across and to influence what was happening."

"We were never completely comfortable with W3C acting as a standards body, with its decision model based ultimately on the personal preferences of the director," says John C. Klensin, distinguished

World Wide Wonks

The W3C has **57 full-time employees** and more than **600 people** from member organizations around the world assigned to **50 groups** working in four domains: architecture, user interface, technology and society and the Web accessibility initiative. **Projects it's working on include the following:**

- **HTTP-Next Generation,** to offer greater flexibility and performance for distributed applications.
- Ubiquitous, **device-independent access** to the Web via television, mobile phones, pagers and the like.
- **Metadata** and a **semantic Web** that uses better ways to describe and catalog information to enable smarter search and retrieval than what is currently available.
- **Platform for Privacy Preferences Project,** which helps Web users learn and influence the privacy policies of Web sites.
- **Web content accessibility guidelines** to help Web developers make content accessible to people with disabilities.
- **Signed XML** (a joint project with the IETF), a way to cryptographically sign XML documents.

– Gary H. Anthes

engineering fellow at MCI. "We've tended to prefer Internet standards work to be done in bodies that more clearly use an open consensus process rather than in limited-membership consortia of any sort, including W3C."

But Klensin praises the W3C's ability to move quickly. "The W3C approach is probably optimal for the design and development of sample advanced technology, especially when it addresses problems two or three years ahead of current products, while the IETF approach is far better for actual standardization," he says.

Power of Standards

Indeed, Berners-Lee says one of his goals in setting up the W3C in 1994 was to make it more nimble than the IETF. "Always, standards processes have been too slow," he says. "The IETF has a particular set of processes, and in some circumstances they work very well and under other circumstances they don't."

As for his power to affect millions of users, he's unapologetic. "Members give a mandate to the consortium to do things, and the director has an executive responsibility to get them done," he says. "But there are a whole set of checks and balances, and there is even a process to review the process."

W3C member The Boeing Co. has an enormously complex and geographically dispersed computing environment, but it's unified by an intranet with 175,000 users, an extranet with 26,000 users and more than 2,000 Web servers. "The Web is of immense importance to us," says Ann Bassetti, Web products manager at Boeing.

Boeing joined the W3C to get early information on Web developments and to influence them as a user, Bassetti says. "For us, interoperability is crucial. Without the W3C, we would not have standardization of protocols, and individual vendors would dominate with their proprietary formats."

Whether one calls them standards or, as the W3C prefers, recommendations, HTML, XML and other technical specifications from the consortium have virtually the force of law. "They have a moral majesty behind them, a moral hegemony," says Carl Cargill, director of standards at Sun Microsystems Inc. and a member of the W3C Advisory Board. "And they have a great deal of acceptance among users."

Cargill says the W3C's members, including Sun, are, in effect, a giant "advisory committee" to Berners-Lee, whom he calls an "honest and reasonably open individual" and an "impartial adjudicator."

But Cargill acknowledges that the director has tremendous power in an arena increasingly vital to the IT community. "Tim's in a position where, if he shakes his head yes, somebody can lose $1 billion, but if he shakes his head no, somebody *else* loses $1 billion," Cargill says.

"If you have a strong opinion on X, and Tim doesn't share it, well, it may be a little tricky to get a standard out," Bradner says. But, he adds, "Tim is the key to ensuring a consistent architecture, to keeping things from fragmenting."

Asked if anything worries him about the future of the Web, Berners-Lee says, "Fragmentation. If TVs end up with one version of HTML, and normal Web browsers end up with a different version, that would be a mess. That could come about commercially if a monopoly player decides it's going to try to tweak the standards so everyone has to follow a little behind. That's a constant threat, because there's a huge commercial incentive to try to carve out a piece."

The answer, he says, is "us doing our job and buyers doing their job as informed by the press." ◗

Through specs like XML and a 'moral majesty' lent by founder

W3C'S WORLD WIDE POWER

Tim Berners-Lee, the World Wide Web Consortium has guaranteed it will help shape the next-generation Web. But the autocratic structure that makes W3C more agile than other groups also rubs some corporations the wrong way By Gary H. Anthes

Leaving Ma Bell Behind

AT&T set out to get a chunk of PC market but found it wasn't ready for the challenge

BY LESLIE GOFF

WHEN the Baby Bell system broke up on Jan. 1, 1984, freeing AT&T Corp. to enter the computer industry, it looked like the former Ma Bell would challenge IBM's dominance in corporate information technology shops.

"It turns out that there is an enormous difference between having R&D expertise in computing and having marketplace expertise," says Sheldon Hochheiser, AT&T's corporate historian.

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Conquering the computer industry seemed like the silver lining in the cloud that settled over AT&T when it signed the 1982 consent decree to give up its regulated telephone monopoly. Up to that time, the government had agreed with AT&T that a "natural monopoly" in local and long-distance telephone service made sense.

The consent decree, ordered by Judge Harold H. Greene following a Department of Justice lawsuit, lifted governmental restrictions placed on AT&T in 1956 that barred it from pursuing any business outside its monopoly. Over the years, AT&T had acquired considerable technological finesse through AT&T Bell Laboratories, which had developed specialized switches, the Unix operating system, the C and C++ languages, as well as computers used internally, Hochheiser says.

As a result, "there was a belief in the hearts of some marketing people that we would give IBM a run for its money," says Burke Stinson, now senior public relations director, who has been with AT&T for 30 years. "We thought we could make the transition to computers very easily."

The company formed a strategic alliance with manufacturer Olivetti U.S.A. to develop and market PCs, and in 1984, AT&T rolled out the PC 6300, an 8086-based system, and the 3B2s, a line of minicomputers. Neither swept away corporate IT buyers.

In 1991, still struggling for a toehold in the industry, AT&T acquired Dayton, Ohio-based NCR Corp., which took over AT&T's computer business. NCR discontinued all the AT&T products, save a laptop model. AT&T has since spun off NCR as a separate company and has withdrawn from computer manufacturing.

"The market as we were getting into it was close to terrible; profits were hard to come by," Stinson says. "And there was a bit of hubris on our part."

For the public, the 1982 decree meant selecting one's own long-distance service provider and, for some, a change in local phone service. In the divestiture, the myriad Bell companies that provided local phone service became the seven regional Bell operating companies: Ameritech Corp., Bell Atlantic Corp., BellSouth Corp., Nynex Corp., Pacific Bell, Southwestern Bell and US West Inc. They have been consolidating since the 1996 Telecommunications Act, which opened up local service competition.

In the post-Telecommunications Act environment, "AT&T is betting its future on Internet protocol technology," not on voice-based technology, Stinson says. Only time will tell which history will repeat itself. ◗

Mac Makes Its Mark

BY LESLIE GOFF

Just as AT&T was unsuccessful when it tried to challenge IBM's position in the PC market in 1984, so, ultimately, was Apple Computer Inc. — despite its multimillion-dollar ad campaign for its Macintosh and a memorable $1.5 million Super Bowl commercial directed by Ridley Scott.

Although the machine captured the hearts of PC enthusiasts with its graphical user interface and anti-Big Brother mythology, it never captured more than 10% of the market.

Steve Jobs typically gets credit for the ideas behind the Macintosh — or for recognizing good ideas when he saw them at Xerox Corp.'s Palo Alto Research Center in 1979. But the man really behind the Macintosh was Jeff Rushkin: He founded the Macintosh team in 1979, gave the Macintosh its name and created click-and-drag objects.

In 1980, when Apple President Mike Markkula forced Jobs off the Lisa system development team, Jobs took over the leadership of the Macintosh project from Rushkin. He moved the team into a separate building, hoisting a skull-and-crossbones flag from the roof. Rushkin left the project — and the company — in 1982.

Jobs unveiled the Macintosh 128K at a press conference Jan. 23, 1984, the day after the airing of the Big Brother commercial. Apple followed up in September with more models. ◗

Goff is a frequent contributor to Computerworld. *Contact her at lgoff@ix.netcom.com.*

1984

Sun Microsystems Inc. releases **Network File System**, which ultimately will become the industry standard for network file sharing. Later, company co-founder **Vinod Khosla** resigns and fellow co-founder **Scott McNealy** becomes Sun's president.

Hewlett-Packard Co. sets the standard for PC printers when it introduces the **LaserJet** laser printer and the **ThinkJet** ink-jet printer.

Michael Dell (at left), a freshman at the University of Austin, Texas, founds **Dell Computer Corp.**

In his science-fiction novel *Neuromancer*, **William Gibson** coins the term ***cyberspace,*** defining it as "A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. . . ." The book establishes the **"cyberpunk"** fiction genre.

IBM introduces its second generation of PCs, the **PC Jr.** and the **PC/AT.** The PC Jr. fails, but the $4,000 80826-based PC/AT, with major performance, RAM and storage capacity increases over the PC/XT, succeeds.

Microsoft Corp. supplies the operating systems for IBM's PC/AT. Buyers can choose between **MS-DOS** or the multiuser **Xenix** operating system. Microsoft also gets behind **Apple Computer Inc.'s** new **Macintosh** computer (see story, this page), shipping compatible versions of Basic and Multiplan on the Mac's first model in January and later announcing the applications Word, Chart and File. The company continues its work on **Windows** but misses release deadlines.

The Domain Name System is established.

Usenet introduces moderated newsgroups.

IBM, Sears, Roebuck and Co. and **CBS** form **Prodigy.** Originally called Trintex, it's intended to be a home banking and shopping service.

A **Usenet** message ostensibly from the **Moscow Institute for International Affairs** on April 1 claims that the U.S.S.R. has connected to the network. Many Usenet users fail to recognize that the message is an April Fool's Day hoax and respond to Soviet leader **Konstantin Chernenko**, welcoming discussion of Soviet politics or expressing outrage. The hoax was perpetrated by **Piet Beertema**, who revealed himself two weeks later and explained how he rerouted messages to his mailbox.

Jim Manzi (at left) is named president and chief operating officer of **Lotus Development Corp.**

Compaq Computer Corp. introduces the **Compaq Deskpro PC.**

Silicon Graphics Inc. ships its first 3-D graphics workstations.

Microsoft rival **Digital Research Inc.** announces the **Graphics Environment Manager**, an icon-based desktop user interface.

Quarterdeck Office Systems releases **DESQ**, a text-based windowing environment for DOS programs.

Ashton-Tate Corp. ships **dBase III.**

Motorola Inc. introduces the MC68020 32-bit microprocessor.

At Comdex/Fall '84, **2,400-bit/sec. modems** make a big splash with presentations by several companies.

MIPS Computer Systems is founded and, working with a research team from **Stanford University**, begins developing its **RISC** architecture.

Compiled by Leslie Goff.

■ Flashback is produced with the assistance of The Computer Museum History Center in Mountain View, Calif.

Have questions about your career?

Fran Quittel

Nationally Recognized Career Expert and Computerworld's CareerAdvisor Columnist

With a lengthy background in high tech careers and recruiting, Computerworld's CareerAdvisor Fran Quittel specializes in providing in-depth information for job seekers and a "Recruiting Scoreboard" to help employers audit and improve their internal recruiting practices. Fran is author of the book *Firepower: Everything you need to know before and after you lose your job* and is the original creator of The FirePower Career Forum on The Microsoft Network. She also publishes career advice at www.careerbabe.com and tips for employers at www.yourcareer.com

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Monday, October 18, 1999

Wyndham Garden Hotel, Dallas, Texas

On October 18, 1999, you have a special opportunity to update your recruiting skills and network with recruiters in your area at the first annual Dallas Area Technical Recruiting & Retention Conference, held at the Wyndham Garden Hotel, Dallas, Texas.

A Full Schedule of Contemporary Topics

7:45am **Continental Breakfast & Conference Registration**

8:30am ***General Session:*** **Topic Name** Judy West, Author of Cyberspace - Jealously Guarded Recruiting Methods

10:00am **Sponsor Showcase/Coffee Break**

10:45am ***General Session:*****Sourcing Techniques** Cathy Peterson, Romac International

12:00pm ***Luncheon Keynote:*** Editor, Computerworld

1:30pm ***General Session:*** **Silent Impact: The Basic Tenets of Staffing & Bottom Line Effects** Dan Hanyzewski, Mastech Corp.

2:45pm **Sponsor Showcase/Coffee Break**

3:30pm ***General Session:*** **Cutting Edge Tools for the Internet Recruiter** Dr. Bret Hollander, NETRECRUITER

5:00pm **Program ends**

Selected sessions include:

Judy West, Author of Cyberspace - Jealously Guarded Recruiting Methods

Let's face it, the way we recruited in the past just won't work in the future. Today's candidates look for a job or make a career move a different way therefore we have to search for them a different way.

Silent Impact: The Basic Tenets of Staffing & Bottom Line Effects

Dan Hanyzewski, Mastech Corp.

The recruitment organization has a silent but profound impact on the success, or lack thereof, on a corporation's financial performance. So how does the staffing department- a cost center- drive a P&L mentality? Find out more in this key session.

Sourcing Techniques

Cathy Peterson, Romac International

Are you covering all your recruiting possibilities in today's market? Get the latest update on the various sourcing techniques in this tactical presentation.

Cutting Edge Tools for the Internet Recruiter

Dr. Bret Hollander, NETRECRUITER

Recruiting changes every second on the Internet. This practical session from a leading internet recruiting pro-fessional will deliver the latest in electronic recruiting tools.

This conference program is developed exclusively for corporate human resource professionals who recruit directly for their hiring organizations. Vendors of selected, targeted products and services may participate through sponsorships and/or exhibits.

* Registration fee includes continental breakfast, lunch, breaks and the complete Conference Resource Guide.

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For more information, call the conference hotline: 1-800-488-9204

Retailers Shop Till They Drop

Retailers are finding that IT pros who can lead e-commerce and large-scale systems implementations are hard to find By Candee Wilde

CONFIDENT consumer spending and the powerful promise of e-commerce is driving technology investment in the retail industry. The result: new job opportunities for information technology professionals.

"Retail has become a technology industry," says Alan Weingarden, who has held CIO positions at several large retail chains and most recently headed the IT department at Hills Department Stores Inc. in Boston. "In the past, retailers looked at IT as a backroom activity, but now it is considered critical, especially since electronic commerce and the Internet are exploding."

The strongest demand among retailers is for IT professionals who can help organizations "shift the entire infrastructure away from a mainframe-centric organization," Weingarden explains. Retail managers need people who understand networking, client/server systems and how to use the Web to support commerce.

Also in high demand: business systems analysts who understand workflow processes and can implement large-scale systems to handle merchandising, overseas sourcing, distribution and customer support.

The retail industry is also experiencing tremendous growth in the use of intranets to connect corporate offices, overseas facilities, stores and distribution outlets. IT professionals with virtually any networking skills — LAN, WAN, IP, client/server — are desperately needed. "The old axiom that 'retail is detail' still holds," Weingarden says. "When you have thousands of stores and millions of customers, that detail can't be managed without networks and data warehousing."

Jon Nordeen, CIO at Downers Grove, Ill.-based Spiegel Inc., agrees that data warehousing has become an essential capability. One of Spiegel's primary IT goals is to integrate all of its customer service services, including point-of-sale, the Internet and call centers. "For us, the Internet is where the action will be," Nordeen says.

Spiegel, like other retailers, is having a hard time finding the talented people it needs in all of those areas. Some retailers say it isn't unusual for a position to remain unfilled for several months.

Database experts and networking professionals are particularly hard to find. To circumvent that problem, Spiegel has developed an internal training program to teach current IT employees these new skills.

The company also strives to keep IT salaries competitive. "The overall compensation for IT positions is escalating, and we've had to respond accordingly," Nordeen says.

Competition with other industries is especially stiff in the quest for IT professionals with data warehousing and Web-related skills. In general, hiring managers say retail industry salaries are roughly in the middle range of all industries (see *Computerworld*'s 13th Annual Salary Survey, page 42). ◗

Wilde is a freelance writer in Easton, Conn.

AT A GLANCE

Top Shelf

Top five skills retail hiring managers seek for IT positions

1. Technical proficiency. Someone who has mastered at least one technology and shows the ability to learn others.
2. Ability to take initiative and deliver results.
3. Project management skills. These include a capacity for both leadership and teamwork.
4. Communication skills – written and verbal.
5. An understanding of the retail business. Not necessary at the time of hiring, but it's a skill that must be acquired relatively quickly.

JEFF SCIORTINO

One Man's Experience

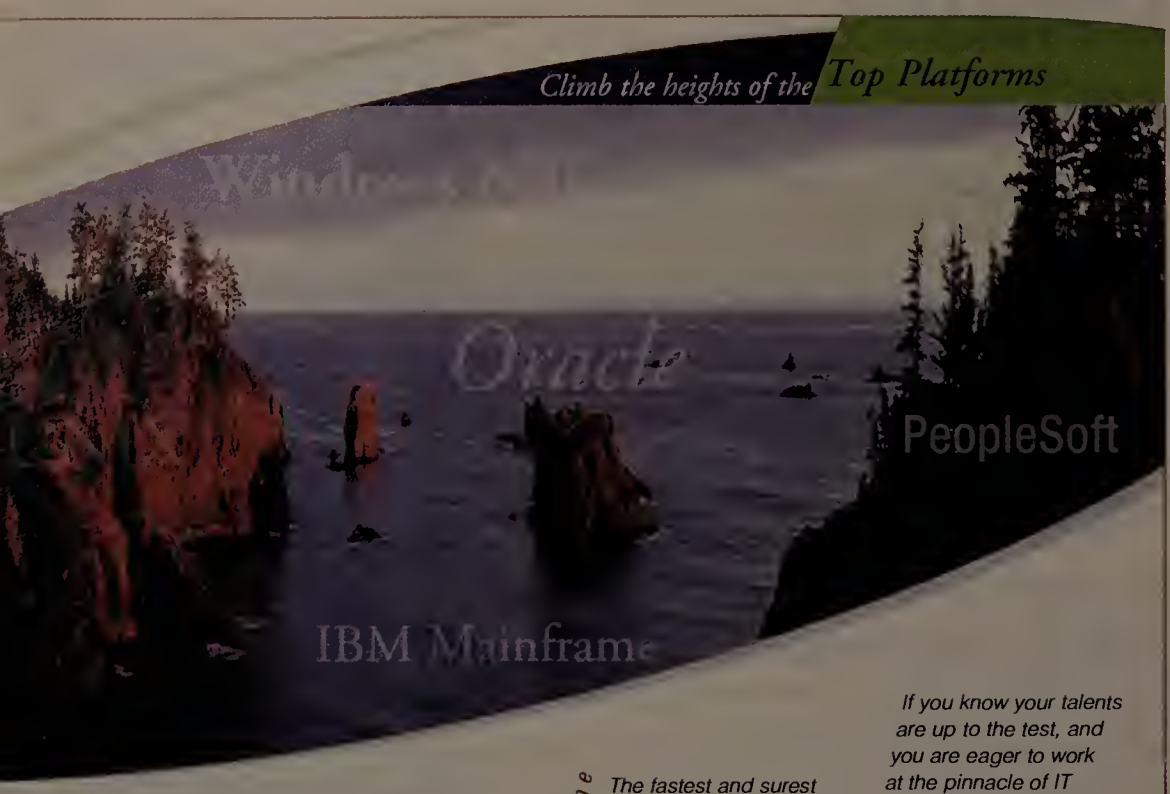
Tim Hemstreet, a 32-year-old project manager in marketing systems at Spiegel and its Eddie Bauer Inc. unit, is responsible for developing and maintaining information systems to support the marketing department. After two and a half years working as a programmer at another company, Hemstreet, who has a bachelor's degree in computer science, joined Spiegel as a programmer. Seven years later, he is supervising an 11-person department.

One of the most important aspects of Hemstreet's job is to be able to apply his understanding of the retail industry and marketing issues to the development of computer systems and applications that can support special marketing projects. For example, Hemstreet's group recently finished creating the computer system to support a new Spiegel catalog marketing program that features a "stored-value card."

Companies use the cards as a sales incentive for their employees, who have "Spiegel dollars" awarded to their cards when they meet their sales goals. Hemstreet worked with Spiegel's marketing group as it designed the program, then worked with his staff to develop a system to manage it.

Hemstreet has clear goals for his advancement. In his current position, he wants to spearhead the development of a computer system to support marketing – one that takes advantage of data warehousing and client/server technologies. After that, he would like to be promoted to a director's post in the department, and he says he ultimately hopes to become a vice president.

Hemstreet says both his technical skills and his understanding of marketing principles have contributed to his success at Spiegel. As a result, he suggests that IT professionals interested in a job at a retail company learn about retailing and develop an understanding of the technologies that are in demand in the industry. "It is imperative that an IS manager understand what the business is trying to accomplish so he or she can design a system to support that goal," Hemstreet says. – *Candee Wilde*



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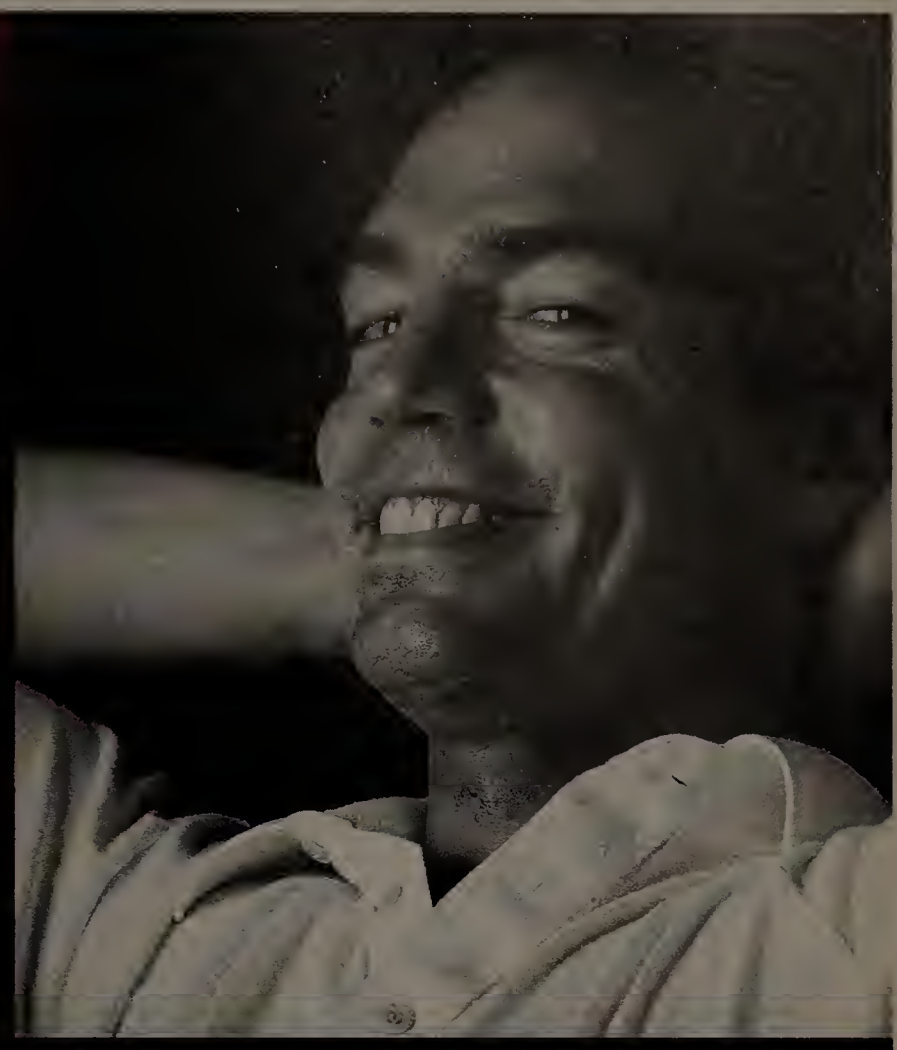

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Tenure track position in Graduate Programs in Software, Spring or Fall 2000. Qualifications: Ph.D. or Masters with intent to obtain doctoral degree. Expertise or knowledge in any area related to software development such as objects, computer communications, computer architecture, information retrieval, and enterprise application integration (SAP, etc). Teaching experience and/or industrial experience in software development a plus. Candidates must be committed to continued professional growth and have a strong interest in quality graduate teaching and in conducting applied research in the software area. Graduate Programs in Software offers three degrees: Master in Software Design and Development, Master of Science in Software Engineering, and a Master of Software Systems. These masters programs seek to improve the software environment by providing knowledge, theory, skills, and experience that are very workplace oriented. The department also offers three graduate certificate programs as well as professional development seminars in areas related to software development. The University of St. Thomas is a Catholic private university. The University is located along the Mississippi River and is the largest private university in Minnesota. It has a total enrollment over 10,000 of which half are graduate students who attend classes in the late afternoon, evening and weekends. Review of applications will begin immediately and continue until the position is filled. Send resume (refer to #200305) and names, addresses, telephone numbers, and e-mail addresses of at least 3 references to: Dr. Bernice Folz, Director, Graduate Programs in Software, Mail #OSS301, University of St. Thomas, 2115 Summit Avenue, St. Paul, MN 55105. EOE

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Plan, conduct and coordinate programming application activities. Develop statements of problems and requirements, design systems and programs, write programs in computer language for solution by means of data processing equipment. Correct program errors, prepare operating instructions, compile documentation of program development, analyze system capabilities to resolve questions of program intent, output requirements, input data acquisition, programming techniques and controls. Code in C language using Structured Query Language (SQL) and Relational Database (RDB). Requires a Bachelor's degree in Computer Information Systems, Management Information Systems, Computer Science or Computer Applications and one year experience in job offered or one year related experience programming in C with RDB and SQL. 40 hour work week. $40,503.96 per year. Apply at the Oklahoma State Employment Service Office, 11654-A E. 21st ST., Tulsa, Oklahoma 74129, (ID#7209), Phone (918) 437-4473, Job Order #380395. Ad paid by an Equal Opportunity Employer.

Technical Professionals

Rapid growth IT/Software company hiring for consulting positions throughout the US. Seeking Systems & Software Engineers (MS+3 or BS+5) with 3-5 yrs exp in any of the following areas:

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- GUI Design (UNIX/Windows)
- Mainframe: COBOL or Assembler, CICS, DB2 or IMS
- DEC VAX, DECFORMS, ACMS or VAX MUMPS

Junior positions (2 yrs exp) available. We offer comprehensive benefits including medical/dental/life insurance and 401(k). Forward resume indicating position of interest to: COMFORCE, Attn: CS Division, 15305 Dallas Parkway, Suite 1150 LB-19, Addison, TX 75001; FAX (972) 866-5150; or email jobs@comforceit.com. EOE

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Software Engineer (4 openings): Design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation. Work involves extensive travel and frequent relocation. Must have one year of experience as a software engineer or computer professional as well as one year of experience using SAP. Bachelors degree in Computer Science/Applications, Engineering, Chemistry, Math, Physics or a business related field. Salary is $85,000 per/yr, 40 hrs/wk., 9:00-5:00 p.m. Please submit resumes to: Mr. Tom Dembosky, Mgr. Indiana Job Center, 350 N. Fourth St., Indiana, PA 15701: Job Order No.: 8054355.

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Data Security Analyst

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WAN Engineer

Design and implement Wide Area Networks for use in on-line lotteries for customers around the world. Working knowledge of the following: Telco, T1, Analog, Digital Technologies, Analog/Digital WAN comm equipment. Test equipment including protocol analysis. Channeled and bulk rate T1, DDS, Analog leased line networks, Frame Relay, X.25, and current dial technologies. POS Network Architecture or Radio and Satellite Design a PLUS.

Regional Communications Specialists

Perform network audits and preventative maintenance for Local Area Networks and Wide Area Networks throughout regional data centers. Strong knowledge of LAN/WAN (i.e. Hubs, Routers, CSU/DSU, Frame Relay, X.25, Sync/Async). Good interpersonal and problem solving skills. Regional travel required (approximately 50-70%). Positions located in the east, midwest, and western United States.

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Software Engineer II. Duties: Responsible for analyzing software requirement based on strong knowledge of database, operating system and network to determine feasibility of design within technology, time and cost constraints. Provide training to junior members of the software engineering staff. Analyze, design, implement, and unit-test software components utilizing C and C++ Programming. Design, document, code and test assigned modules of wide scope and complexity for company products. Work on-site to implement and design changes to products in Asian market. Plan the development of components of new and enhanced products for Asian market. Assist computer programmers in translating and adapting software products to accommodate differences in language, culture and hardware for use in Asian countries. Requires: B.S. in Computer Engineering or related field. 1 yr exp. in job offered or as a Systems Analyst or Software Engineer. Exp., which may have been obtained concurrently, must include the following: 1 yr. exp. utilizing C and C++ Programming. Must be familiar with Chinese character set. EOE. 40 hrs./wk. Salary: $57,678/yr. Send resume (no calls) to: Mitzi Thomas, Attachmate Corporation, 8230 Montgomery Road, Cincinnati, OH 45236.

Senior Software Engineer

Logica, Inc. is a system integration & software consulting firm looking for someone to manage software engineers and effectively deliver technical solutions. You will have knowledge of desktop, WEB, client/server, C, C++, and JAVA. Knowledge of Object Oriented Programming on the UNIX platform as well as Database and Network Protocols is essential. Our goal is to take the lead in implementing & integrating various commercial billing systems for Wireless Telecommunications operators. MS in CS, EE or related field along with 3 years' programming experience required. Other requirements include 1 year of experience with telecommunications products/operations or data communications, relational databases, database programming and client server technology. Email to: careers@logica.com or fax: (617) 476-8010. EOE

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SOFTWARE ENGINEER to design, develop, implement and distribute n-tier and client/server software applications using structured methodologies and object oriented programming, GUI tools, PowerBuilder, PFC, SOL, Java, Jbuilder and SAP R/3 ABAP/4 WorkBench tools; Design logical and physical data models for Relational Databases using Oracle, SQL*Server and Sybase SQL*Server; Partition applications between clients and servers; Develop and optimize Stored Procedures, Packages and Triggers in Oracle and Sybase SQL*Server; Design, enhance, optimize, migrate and distribute applications into multi-tier architecture; Review Data Extracts to design the data structures and automate import and export of data between the systems over a secure network; Manage versions and backups using the Object Cycle Version Manager; Write interface programs for the software modules to be distributed as CORBA compliant objects on the network; Train users. Require: M.S. degree in Computer Science/Engineering, or a closely related field, with two years of experience in the job offered or as a Software Consultant/Programmer. Extensive travel (50%) to various client sites on long term assignments within the U.S. Salary: $65,000 per year, 8 am to 5 pm, M-F. Send resume to: Sanjeev Tirath, Director, Pyramid Consulting, Inc., 5335 Triangle Parkway, Suite 510, Norcross, GA 30092. Attn: Job RB.

SOFTWARE ENGINEER to design, develop, implement, install and maintain SAP R/3 client/server-based software systems and functional components to manage comprehensive financial, manufacturing, sales and distribution, and human resources functions essential to our clients' operations; Utilize the Financial Accounting (FI), Sales and Distribution (SD), Material Management (MM) and Production Planning (PP) modules of SAP R/3 as well as SAP script, ABAP/ 4, Report Writer and Report Painter functionalities; Utilize the Product Costing and Profit Center accounting modules of Controlling (CO) and the General Ledger, Accounts Payable and Accounts Receivable modules of FI; Independently configure, test and support the Product Costing, Cost Center Accounting and the Profit Center Accounting modules. Require: Master's degree (or equivalent) in Business, Computer Science, or a closely related field, with two years of experience in the job offered or as a Systems Analyst. A Bachelor's degree with an additional five years of progressively responsible experience in the field will be considered equivalent to a Master's degree. Extensive travel on assignments to various client sites within the U.S. is required. Salary: $80,000 per year, 8 am to 5 pm, M-F. Send resume to: Sanjeev Tirath, Director, Pyramid Consulting Inc., 5335 Triangle Parkway, Suite 510, Norcross, GA 30092; Attn: Job SN

Oracle Database Administrator resp. for the logical & physical design, installation, implementation & administration of database using Oracle Database. Design, develop & implement system enhancements and modifications. Perform fine tuning of Oracle RDBMS within the database & general administration for performance & problem resolution. Manage database security & access/ control. Plan and implement backup and recovery methodologies. Monitor and optimize database performance. Perform software upgrades to higher versions of Oracle software and apply patches. Requires: BS (or foreign equiv.) in Comp. or Info. Science, or a related field and 3 yrs. exp. in the job offered or 3 yrs. exp. as a Systems Analyst or Systems Engineer. Exp., which may have been obtained concurrently, must incl. 3 yrs. exp. installing, implementing & administering of database using Oracle Database & 3 yrs. exp. performing fine tuning of Oracle RDBMS for performance & problem resolution. EOE. 40 hrs./wk.; 8:00am to 5:00pm. Salary: $63,000/yr. Send resume (no calls) to: Earle Crum, CTG, Inc., 5020 Ritter Rd., Suite 103, Mechanicsburg, PA 17055-4837.

SOFTWARE DEVELOPER: Design and develop computer software applications or modules and/or enhance and modify existing applications or modules incorporating 3-tier, client/server, Open Systems Architecture. Analyze User requirements; create design documentation and code, test and debug applications and/or modules. Build and manage commercial databases with very large volumes of data in distributed UNIX environment. Recommend and Implement data recovery and back strategies, maintain structure, database performance tuning and testing. Located in Miami, FL. Requires: M.S. degree in CS or MIS and 2 years experience developing and administering Sybase database. Demonstrated knowledge of the design and implementation of heterogeneous systems. Strong knowledge of PowerBuilder, TCP/IP, IPX/SPX protocols, HP9000 (HP-UX), IBM RS/6000, MS Windows, Novell Netware, SOL. Knowledge of Lotus CC-Mail, OSI protocols, UNIX shell scripts. Good communication skills. Salary: $63,000.00/yr; 40 hrs/wk (9 to 5). Send resume to Bureau of Workforce Program Support, PO Box 10869, Tallahassee, FL 32302, Att: RE: JOFL #1992009.

SYSTEMS ENGINEER to design, develop, test, implement, maintain and upgrade real-time networking, network gateway, and artificial intelligence software using C, C++, Assembly, MFC, ActiveX, COM, COM+ and DCOM; Develop hardware involving embedded real-time systems by applying mixed analog/digital technical and FPGA design. Require: Baccalaureate degree in Computer/Electrical/ Mechanical Engineering, or a closely related field, with 3 years experience in the job offered; A Master's degree with one year of experience with be accepted in lieu of the Baccalaureate degree and three years experience. Must have the present ability to work permanently in the U.S. Salary: $60,665 per year, 8:00 am to 5:00 pm, M-F. Apply by resume to: Janet R. Smith, HR Manager, Siemens Energy & Automation, Inc., 100 Technology Drive, Alpharetta, GA 30005; **Must include Attn: Job DJ**

Database Administrator - B.S. or equiv. combination of college educ. & exper. (Ratio: 1 yr. educ.: 3 yrs. exper.) in Comp. Sci./Physics with 3 yrs. exper. as a Database Admin, or in S/W Design & Develp'mt. Pos. requires extensive knowledge in admin. of Informix Online Dynamic Server in addition to monitoring performance & installing/maintaining Informix Online Dynamic Server. Resp. for database admin. of Informix Online Dynamic Server databases. Installing & maintaining production databases, maintaining database integrity & security & monitoring databases for optimum performance. Resp. for backup & restores. Job located in Temple Terrace, Florida. Mail resume w/salary req'mts. to Pos. 4113, Human Resources, Business Oriented Software Solutions, Inc., 3040 Holcomb Bridge Road, Suite D-2, Norcross, Georgia 30071. No phone calls please.

MIS Manager: Design, develop, and implement customized information systems, software programs and modifications using various systems including database management systems and 4th generation languages, in both Windows and Dos platforms,: collect, analyze, evaluate test results and implement changes necessary as a consequence of analyzed results and prepare technical reports of the problem areas; recommend and implement new data handling and programing techniques and remove system malfunctions; train users in the use of new systems and respond to inquiries. Must have 2 yrs experience in position, salary $50,000/year; Mon/Fri; 9am/ 5pm; send resume to ESI, 8095 NW 64th Street, 2nd floor, Miami, FL, 33166.

Senior Systems Analyst to perform complex and critical systems analysis tasks on SAP (Systems, Applications and Products in Data Processing) systems including R/3 Basis Production, planning, including installation, implementation, trouble shooting, resolving technical problems, working out software modifications to suit client requirements at various client locations; to maintain close liaison with SAP computer scientists and engineers to work out software modifications using related computer hardware and software. Need MBA and knowledge and experience in SAP systems including SAP R/3 Basis and related hardware and software applications. The qualified applicant can work from his/her home. Travel to client sites required. Salary is commensurate with experience and knowledge. If qualified send resume and cover letter documenting minimum qualifications to Global Core Strategies, Inc., 1 Landmark Square Suite 130, Stamford, CT 06901.

SAP Consultant (multiple positions) to consult with client to define business need or problem relating to manufacturing application; analyze business processes & document flow, & prepare functional specifications for same; design, develop & customize information structures using SAP module; perform data conversion from existing system to newly defined SAP system; assist in implementation of solutions; & report findings & recommendations to client; Reqs. Master's in Comp. Sci., Systems Analysis, Comp. Info. Systems, Mgmt. Info. Systems, Bus. Admin., Management, Mech. Engg., Indus. Engg., Manuf. Engg., Engg. Mechanics & Mgmt., Comp. Engg., Electrical or Electronics Engg., Statistics or Mathematics or its foreign educ. equiv.; $64K, 40 hrs/wk, 8a-5p. Submit resume or C.V. to The Phila. Job Bank, 444 N. 3rd St. - 3rd Fl, Phila, PA 19123, JO#9100643

SOFTWARE ENGINEER to provide on-site consultancy to analyze, design, develop, test, implement and support business application software using MVS/ESA, JCL, VSAM, DB2, SQL, QMF, SPUFI, IMS-DB, FILE-AID, ABEND-AID, CSP, ADABAS, PLATINUM, XPEDITER, PANVALET, RACF, MFS, CICS, IMS-DC, C-370, VS COBOL II, SAS, APS, CHANGEMAN, NETMAN and INSPECTOR on operating system MVS/ESA in IBM mainframe environment; design and develop IBM reletional database DB2; interface mainframe applications to client/server applications using MO-Series and perform related Oracle database activities under UNIX. Require: M.S. in Electronics Engineering or Computer Science and two years experience in the job offered or as Programmer/ System Analyst. 40% travel to client sites within the United States required. Salary: $65,000 per year, 8:30 am to 5 pm. M-F. Apply with resume to: President, YASH Technologies, Inc., 2100 Parklake Drive, NE, Suite F, Atlanta GA 30345-2167.

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At Lucent Technologies, we're defining the future of telecommunications. We're looking individuals with an MS and/or 1-2 years of directly related experience in: Software Development, Software Engineering, Database Engineering, Software Architecture, Software Testing, System Administration & Integration, Electrical Engineering, RF Engineering, IS Managers, IS Analysts (Oracle Development/ Applications, Network C++/WinNT Development), UNIX Systems Administrators, Network Analysts and Phrase Development Analysts. We seek expertise in the following: CDMA, C/C++/UNIX, Switching Technology, RDBMS, GUI Design, Internet/Network Protocols, Wireless Telecommunications, Software Tools and Object Oriented Methodologies/ SmallTalk.

Please send your resume for our review to: Lucent Technologies, Inc., Scanning Operations, Attention: 63/090699/ND, 283 King George Road, Warren, NJ 07059. EOE

Systems Analyst (Bluebell, PA and various client sites in U.S.) Analyze client rqrmnts., procedures, problems to automate processing and improve existing systems; Confer w/ business users to analyze current operational procedures, identify problems, learn input/output rqrmnts.; Write detailed dscrptns. of user needs, prgrm. functions, and steps rqrd. to dvlp. or modify systems; Analyze capabilities, workflow and scheduling limitations to determine possibilities; Prfrm. coding duties and maintain time schedules within client time constraints; Perform analysis, design, and testing duties; Utilize C, C++, Visual C++, and Microsoft Sequel Server technologies; Bachelors in Comp. Sci. or Tchnlgy. & 2 yrs. exp.. in job offered; 40hrs./wk.; 9 to 5; $65K/yr.; Job Order 5027228; Submit resume or C.V. to The Phila. Job Bank 444 N. 3rd St. 3rd Fl. Phila. PA 19123.

Job # 8054703 -- Software Engineer -- will develop software systems, applying computer science, engineering and mathematical analysis, using: SAP. Must have at least 18 months of experience with SAP. Extensive travel and frequent relocation. Bachelor's degree in: engineering, mathematics, computer applications or physics. $120,000.00 yr. 40 hrs/wk. 9:00 am-5:00 pm. Send resume, listing above job number to Mr. Greg Schwing, manager, Mon Valley Job Center, 345 Fifth Avenue, Mckeesport, PA 15132

Programmer Analyst needed F/T by Software dvlpmt & comp consulting services Co. in Parsippany. Must have 1 yr exp dsgng & dvlpng applics for mainframe & C/S tech in C, C++, COBOL, PASCAL, JAVA, GUI, X-Motif, Easytrev, Easytrev+, HTML. Masters in Comp Applics or Comp Sci needed. Respond to: Avanthi Soft, Inc., 3579 Rt. 46, Ste #71A, Parsippany, NJ 07054.

Software Engineer wanted by Computer Services Co. in Iselin, NJ. Must have Masters in Comp Sci, Comp Engg or Elec Engg and 6 mos exp analyzing, dsgng & dvlpg comp s/ware using Visual Basic (ActiveX, OOD, 3-Tier), ACCESS and ORACLE/PL-SOL incl web dvlpmt (Active Server Pages) using VBSCRIPT, JAVASCRIPT and HTML. Respond to: HR Dept, Pierce Technology Corporation, 33 Wood Ave South, 8 Fl, Iselin, NJ 08830.

Data Base Analyst needed F/T by California based Comp S/ware & Systms dvlpmt/consulting CO for job loc in Manh. Must have 1 yr exp analyzing, dsgng & implmtg logical & physical d/base for multidimensional (OLAP) applic based on relational d/base systm using SQL. Bach in Comp Sci or Comp Engg or Math. Respond by resume to: Ed Stanislawski, Mineshare, Inc., 3420 Ocean Blvd., Suite 3080, Santa Monica, CA 90405.

Data Base Analyst needed F/T by California based Comp S/ware & Systms dvlpmt/consulting Co for job loc in Boston, MA. Must have 1 yr exp analyzing, dsgng & implmtg logical & physical d/base for multidemensional (OLAP) applic based on relational d/base systm using SOL. Bach in Comp Sci or Comp Engg or Math. Respond by resume to: Ed Stanislawski, Mineshare, Inc., 3420 Ocean Blvd., Suite 3080, Santa Monica, CA 90405.

Systems Analyst wanted by Computer Consulting Co. in Philadelphia, PA. Must have Bach in Comp Sci or Comp Eng or Math & 2 yrs exp analyzing, dsgng & dvlpg systems & prgms using Design/1 & APS tool sets w/macros, Client Express, Online Express, report writer and CICS/D32/VSAM/ISPF mgmt. Respond to: HR Dept, Attn: Rani Jaganmohan, Object Xperts Inc, 2 Penn Plaza, Ste 27, Philadelphia, PA 19102.

Software Engineer sought by IS/IT Professional Consulting Services Co. in Woodbridge, NJ for client locs throughout US. Must have 2 yrs computer exp and Bach in Comp Sci or Engg. Respond to: HR Dept, Future Technologies, Inc, 1 Woodbridge Center Dr, Ste 300, Woodbridge, NJ 07095.

Project Manager needed by IS/IT Professional Consulting Service in Teaneck, NJ for client locs throughout the US. Must have Masters or equiv in Comp Sci, Comp Engg or Engg and 1 ½ yr s/ware exp. Respond to: HR Dept, Cognizant Technology Solutions U.S. Corp., Glenpointe Centre West, Teaneck, NJ 07666.

Software Engineer wanted by IS/IT Consulting Services Co. in New York City for unanticipated locs throughout US. Must have 4 yrs s/ware exp. Respond by resume to: HR Dept., Intermedia Group, Inc., 5 Hanover Square, 15 Fl., New York, NY 10004.

F/T Software Engineer needed by S/ware Dvlpt & Consulting Co in Charlotte, NC. Must have 3 yrs exp analyzing, dsgng & dvlpg s/ware systm using Visual C++, HTML, CGI, JAVA, SOL & C/S under UNIX platform. Must have Bachelors with 5 years exp. in job offered or as a Programmer Analyst. (Masters with 3 years in job or as programmer analyst acceptable). Respond to: HR Dept., Enterprise Solutions, Inc., 10400 Mallard Creek Road, Suite #210, Charlotte, NC 28262

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Full-time Project Manager, Client/Server Development. Responsibilities include: manage multi-tiered Client/Server, Internet/Intranet based, multi-user, re-engineering projects throughout the United States; manage systems analysts, business analysts and support staff; plan, monitor and prepare status reports; audit applications quality to ensure adherence to Quality Management Systems; manage implementation of applications; manage user acceptance tests and user training; serve as chief liaison between client and Director of Software Division; manage installation and tuning of Microsoft MS-SQL Server; manage installation and perform Capacity Planning for applications. Must have a Master of Science degree or foreign equivalent in Computer Science or a related field and at least three (3) years of progressive experience in systems analysis or a Bachelor of Science degree or foreign equivalent and at least five (5) years of progressive experience in systems analysis. Must be fluent in the design, development and implementation and optimization of applications and databases using Microsoft MS-SQL Server and front-end tools, Visual Basic, Visual InterDev and Case Tools, Visio and S-designer, and Operating Systems Windows 95/98, WindowsNT and UNIX. Experience must have included development of Multi-Tiered Client/Server, Internet/Intranet applications and GUI tools on Internet Information Server (IIS), Microsoft Transactions Server (MTS) and WindowsNT environments. Must be willing to travel to client sites Monday-Friday. Must have proof of legal authority to work in the United States. Salary Range: $64,002 - $80,000 per year. If interested, submit resume in duplicate to: Ms. Anne Keller, NIIT (USA), Inc., 1050 Crown Pointe Parkway, Suite 900, Atlanta, Georgia 30338

Full-time Project Manager, Client/Server Development. Responsibilities include: manage development and implementation of client/server, object-oriented applications utilizing C, C++ and JAVA programming languages, Unified Modeling Language ("UML"), UNIX API's and front-end tools Including Ingres and Ingres Forms; manage professional Systems Analysts and support staff; plan, monitor and prepare status reports; manage audit of applications quality to ensure adherence to Quality Management Systems; manage user acceptance tests and user training; serve as chief liaison between client and Director of Client/Server Applications Development. Must have a Master of Science degree or foreign equivalent in Computer Engineering or a related field and three (3) years of progressive experience in systems analysis or programming analysis for client/server applications or a Bachelor of Science degree or foreign equivalent in Computer Engineering or a related field and at least five (5) years of progressive experience in systems analysis or programming analysis for client/server applications; must be proficient in C/C++, UML, UNIX and VMS operating system internals, VMS to UNIX migration, portable software development standards such as POSIX, Ingres SQL and Intormix C-ISAM and performance tuning. Must be willing to travel to client sites Monday-Friday. Must have proof of legal authority to work in the United States. Salary Range: $64,002 - $80,000 per year. If interested, submit resume in duplicate to: Ms. Anne Keller, NIIT (USA), Inc., 1050 Crown Pointe Parkway, Suite 900, Atlanta, Georgia 30338

Programmer Analyst/
Software Engineer

Multiple openings w/NJ IT firm: - Software Engineers - Must have Masters in Comp Sc or IS or engrg w/3 yrs of exp. as Software Engrs or in related occupations as Progs or Syslems Analysts. Alternately, those w/Bachelors in Comp Sc or IS or engrg should have 5 yrs of exp as Software Engrs or as Prog Anlysts. - PROG ANALYST - Bachelors in any tield w/2 yrs exp as P/A or as Progs. A variety of skill sets required. Qualified candidates should send 2 resumes: AIM 2000 Systems, Inc., HR Dept, 1 Lincoln Highway, Suite 16, Edison, NJ 08820

Applications Database Administrator. Installation, creating and sizing databases based on user requirements, migration of one version of database to another, backup and recovery, performance tuning, security and patch application for both test and production environments. Installation and configuration of thin and fat clients of Oracle Applications on client PCs. Installation, configuration and usage of tools such as Oracle Enterprise Manager (OEM), DBArtisan, ER Win, Designer/2000, Developer/2000, Oracle Discoverer, Oracle Applications Desktop Integrator (ADI), ARC serve, PC Anywhere, PL/SQL, Java Database Connectivity (JDBC) and Shell Scripts. System administration of Oracle Applications, UNIX, Windows NT and Novell NetWare is essential. Using General Ledger (GL), Accounts Payable (AP), and Cash Management (CE) modules of Oracle Applications functionally and technically. Usage of Oracle Applications administration utilities such as Adaimgr, Adadmin, Adpatch and Adworker. Must have an M.S. in Computer Science. Must have one academic course each (OR six mos exp each) in the following areas: Database Management Systems; Distributed Database Systems; Computer Communication Networks and Distributed Processing; and Object Oriented Analysis and Design. Must have two yrs exp in the job offered OR two yrs exp as a DBA Developer OR Programmer Analyst OR Software Engineer. Exp must have included 2 yrs with Oracle databases/tools, UNIX (and/or Windows NT and/or 95), Novell Net Ware, Developer/2000, JDBC, PL/SQL, Shell Scripts, ER Win (and /or Designer/2000), DBArtisan (and/or OEM); and exp must have included 1 yr with Oracle utilities and applications (GL, AP, and CE modules). Skills/experience may be verified by academic letter(s), reference(s), and/or testimonial(s), if requested. 40 hrs/wk, 8:00am-5:00pm, $80,000/yr. Must have proof of legal authority to work indefinitely in US. Send resume, cover letter, and academic transcript In **duplicate** to Job Order No. 615615, Jobs and Training Division, VT. Department of Employment and Training, P.O. Box 488, Montpelier, VT 05601-0488.

PROJECT MANAGER to plan, direct and coordinate projects related to the design, development, testing, implementation, maintenance and support of business critical software systems on IBM mainframe, DEC, SUN and PC machines using CICS COBOL, VS COBOL II, EZTRIEVE, SAS, Oracle RDBMS (Forms, Reports), DB2, Informix, VSAM, PowerBuilder, HTML, C++, Java, JCL, TSP/ISPF, Xpediter, FileAid, AbendAid, QMF, SCLM and Infoman under MVS, CICS, SunOS, Sun Solaris, Windows 95/NT and HP Openview operating systems; Design, develop, enhance and test LANs, WANs, voice networks and PC networks using Ethernet, Token Ring, FDDI, Enterprise routers, CSU/DSU, multiplexer, data encryptors, protocol exchange, and SNA gateways; Ensure that goals and objectives of projects are accomplished within prescribed time frame and funding parameters; Establish work plan and staffing for each phase of project; Conter with project staff to outline workplan and to assign duties, responsibilities, and scope of authority; Prepare project reports for management and clients; Confer with project personnel to provide technical advice and to resolve problems. Require: M.S. degree (or equivalent) in Computer Science, Electrical/Electronics Engineering, or a closely related field, with 1 year of experience in the job offered or as a Project/Team Leader; A B.S. degree with an additional five years of progressively responsible experience in the field will be considered equivalent to an M.S. degree. Salary: $70,000 per year, 9 am to 6 pm, M-F. Apply by resume to: Vivek Mukharya, VP, Citibank, N.A., 8787 Baypine Rd., Jacksonville, FL 32256; Attn: Job SS.

Director of Communication
Software Products

Directs and coordinates, personally and through subordinate managerial personnel, the requirements definition, design and development of all software communication and networking management system products for online, real-time Lottery systems. Communication software products run on multiple hardware platforms including Digital Equipment Corporation Alpha and VAX systems, Intel 486 and 286 processors; and on multiple software platforms including Digital Equipment VMS, Open VMS and UNIX operating systems and Integrated Systems' PSOS real-time operating system kernel.

In conjunction with Marketing and Senior Management, develops a Communication Software Product strategic direction and plan. Develops options and a cost/benefit analysis of each option. Makes recommendations to senior management. Develops and/or directs the development of requirements statements based on prior knowledge of the online Lottery/gaining market needs and interviews with Marketing, Sales, Operations and customers. Identifies new products and deliverables. Creates development plans and directs actual development. Identifies opportunities for incorporation of third-party software products. Directs the evaluation of third-party software products. Negotiates licensing fees with selected third-party vendors. Participates in dialogue with customers on the application of technology in the internationally diverse gaming market.

Manages the operations of the Communication Software Products development group. Plans annual budgets and ensures that actual expenses are within approved budgeted guidelines. Recruits full-time mid part-time staff as needed to meet product delivery commitments. Identifies capital equipment needs, evaluates options, initiates purchase and arranges for training as needed. Oversees personnel development. Provides career counseling. Identifies professional growth opportunities for individuals.

In conjunction with peer development managers in Systems Engineering, Communication Hardware Products Engineering, Lottery Software Products Engineering and Hardware Products, coordinates development of Lottery system-wide products.

Directs configuration management of Communication Software Product deliverables. Develops and follows software policy and procedures. Coordinates with Software Quality Assurance for independent testing and verification of delivered software. Coordinates the transfer of communication software products to the Support organization for maintenance and enhancement. Provides on-going software configuration recommendations and support to the Support and Operations organizations. Directs the development of user documentation for communication software products. Provides development status to Senior Management. Identifies risks and issues to development plans and recommends alternative solutions. Develops and executes contingency plans on an as-needed basis.

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SENIOR SOFTWARE ENGINEER project lead with two years of industry experience to design, develop and implement software applications using Oracle, Developer 2000, SQL, C++ and Unix. Excellent communications skills required. Master's degree or equivalent required. Fax resume to: HR (781) 932-0895 or email: tbetti@raymondkarsan.com

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PROGRAMMER ANALYSTS (Job # 1089163)

Performs development, integration, and maintenance activities for enterprise software systems. Builds, assembles, and implements software systems for use in operational, tactical, and strategic systems. Implements, maintains, and monitors application databases. Requires knowledge of system development, integration practices and of database design and implementation (Oracle preferred). Proficiency in relevant software development languages and tools. Java, Cobol, and PowerBuilder opportunities available. Starting salary $44-$75,000.

TECHNOLOGY ASSESSMENT SPECIALISTS (Job # 1080007)

Evaluates new and emerging technologies for use in schools and support offices. Develops information technology architectures and integration guidelines. Requires strong networking, desktop and server operating system software, and technical writing skills. Starting salary $46-$57,400.

TECHNOLOGY SUPPORT SPECIALISTS (Job # 1080006)

Provides user support and training to teachers and school staff. Installs, trouble shoots, and maintains computer software and peripheral equipment in schools. Requires knowledge and skill troubleshooting and maintaining PCs, software, and equipment. Starting salary $37-$66,000.

FIELD SERVICE TECHNICIANS (Job # 1090003)

Repairs and installs computers and a variety of electronic equipment including telecommunications, sound and life-safety systems. Requires training and experience in repair of computer and electronic equipment. Starting salary $25-$48,000.

COMPUTER OPERATORS (Job # 1090001)

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Systems Analyst: Experienced in Dsgn, dvlp, implement, sophisticated software and database systems for travel business; Test, maintain systems, perform trouble shooting & train end users; Use APPOLO & SABRE. Req. Bach. in Comp. Sci, Maths or Engg. Send resume Legend Travel & Tours, 3609 Seven Mile Lane, Suite #1600, Baltimore, MD 21208.

Applications Programmer needed F/T by Software Dvlpmt Co. in Iselin, NJ. Must have 2 yr exp analyzing ERP system for feasibility dsgn. Respond to: HR Dept., Polaris Software Lab, Inc., 104 S. Hyde Avenue, Iselin, NJ 08830.

Software Engineer: Develop, Implement, Manage and maintain Multi Server NT LAN PC's. Win 95/NT Servers, TCP/IP Networking and System Programming. Req. Bach Degree w/5 yrs exp. Send resumes to HRD, Corpnet Systems, 93 George Street, Cataret, NJ 07008.

Software Developer sought by Insurance Co. in White Plains, NY. Must have BS in Comp Sci or Math based degree and 2 yrs dvlpg/prgmg exp. Must know Powerbuilder and have insurance experience. Respond to: HR Dept, Hermitage Insurance Co., 707 Westchester Ave, Ste 411, White Plains, NY 10604.

Information Technology Analyst: Must have exp. in research & analysis of emerging trends in IT to identify viable systems & paradigms. Research will involve analysis of state of art technology and identification of viable concepts. Bachelors Degree (any) w/3 yrs as Information Technology Analyst or Marketing Manager Exp. in analysis of IT needs of individual clients, a must. Send resumes to HRD, Corpnet Systems, 93 George Street, Cataret, NJ 07008.

IS RF/RM Accounts Payable ABAP Programmer needed F/T by Software Services Co. in Atlanta, GA for Richmond, VA job loc. Must have 2 yr SAP exp. Bach deg needed. Respond to: HR Dept., JLS Software Services, 1995 N. Park Place, Ste 220, Atlanta, GA 30339.

Software Engineer: Dsgn, dvlp, implmt sophisticated s/ware & d/base systms w/ h/ware choices for applic in industry, scientific estab & fin'l institutions w/needs for latest info tech. Perform testing/maintenance, trouble shooting, debugging, source code & impact analysis using WinNT, UNIX, Oracle, SQL Forms, PL/SQL, Pro*C & SQL Plus. Participate in Co's strategic planning to meet evolving needs of client. Req Bach in Comp Sci, Math, Engg w/5 yr exp in job offered or 5yr exp as Prog Analyst. Send resume to Magnosolve, Inc. 302 Forest Drive, Edison, NJ 08817.

Chief Programmer/Analyst needed by Hotel in Myrtle Beach, SC. Must have bach or equiv in Computer Prgmg & 4 yrs comp exp. Respond to: HR Dept, Eastern Seaboard Management Co, 300 N. Ocean Blvd, N. Myrtle Beach, SC 29582.

Principal Software Engineer. Design and develop distributed computing client/server-based applications within Windows and UNIX environments. Design and code 32-bit Microsoft Windows-based GUIs. Work with ODBC, SQL, Triggers and stored procedures using database systems. Work with cross platform software development on Unix platforms. BS (comp sci, rel field/equiv) and 5 yrs exp. (or 5 yrs exp as Software Engineer). 40 hrs/wk. Send resume to: Human Resources Department, Siva Consultancy Services, Inc., 83 Second Avenue, Burlington, MA 01803.

Software Engineer needed by Graphic Design Co. in San Francisco, CA. Must have Bach in Comp Sci or Electrical Eng and 2 yrs experience in software localization or related work. Respond by resume to: HR Dept, Koyosha Graphics of America, Inc., 821 Sansome St, San Francisco, CA 94111. Fax (415) 283-1801

SOFTWARE ENGINEER to design, develop, implement, test and maintain application software in a client-server environment using COBOL II, DB2, CICS, JCL, VSAM, Revolve 2000, File-Aid and Endevor on MVS operating systems. Require: M.S. degree in Computer Science/Engineering, or a closely related field, with 2 years experience in the job offered or as a Programmer/Analyst. Extensive travel on assignments to various client sites within the U.S. is required. Salary: $65,000 per year, 8:00 am to 5:00 pm, M-F Send resume to: Jack Patil, Americus Global Software, Inc., 1900 The Exchange, Building 200, Atlanta, GA 30339: Attn: Job PG

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Senior Programmer to develop new products in RF Internet and e-payments. Applicant must be proven team leader with experience designing and implementing proprietary software solutions with ultimate responsibility for product performance, provisioning Internet services over radio frequency infrastructures, design and maintenance of e-commerce enabled web sites and monitoring of WANs with knowledge of IP, UDP,TCP and application protocols (HTTP, SMTP, POP, SNMP, DHCP, BOOTP,TFTP,FTP). Applicant must have detailed understanding and 3 years experience using C,C++, PERL, Pascal, Delphi, VB and VBA to design software solutions including kernel level device drivers and application level macros and must be able to create solutions on DOS, WIN95/98,WINNT (2000), AIX, Unix and Linux platforms. Position provides 24/7 on-call support for resolution of database anomalies, performance and network connectivity. Requires a Bachelor's degree in CompSci or EE and 3 years experience in the job offered. Salary $50K annually. Must have proof of legal authority to work in U.S. Send resume and cover letter documenting minimum qualifications and salary history to: Beacon Financial Group, Inc. 1501 Commerce Drive, Carlisle, PA 17013 or via email to info@bfgi.com.

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Dan Hanyzewski, Mastech Corp.

10:00am **Sponsor Showcase/Coffee Break**

10:45am ***General Session:***
Sourcing Techniques
Cathy Peterson, Romac International

12:00pm ***Luncheon Keynote:***
Tech Talk 2000
Cynthia Morgan, Editor, Computerworld

1:30pm ***General Session:***
Defending the Fort, Retention Techniques
Joe Andrews, Progress Software

2:45pm **Sponsor Showcase/Coffee Break**

3:30pm ***General Session:***
Cutting Edge Tools for the Internet Recruiter
Dr. Bret Hollander, NETRECRUITER

5:00pm **Program ends**

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Dan Hanyzewski, Mastech Corp.
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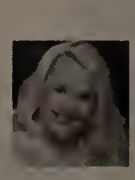

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Cathy Peterson, Romac International
Are you covering all your recruiting possibilities in today's market? Get the latest update on the various sourcing techniques in this tactical presentation.

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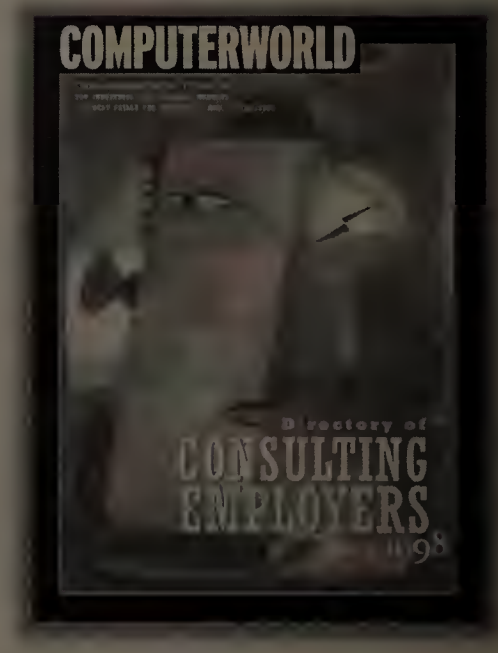

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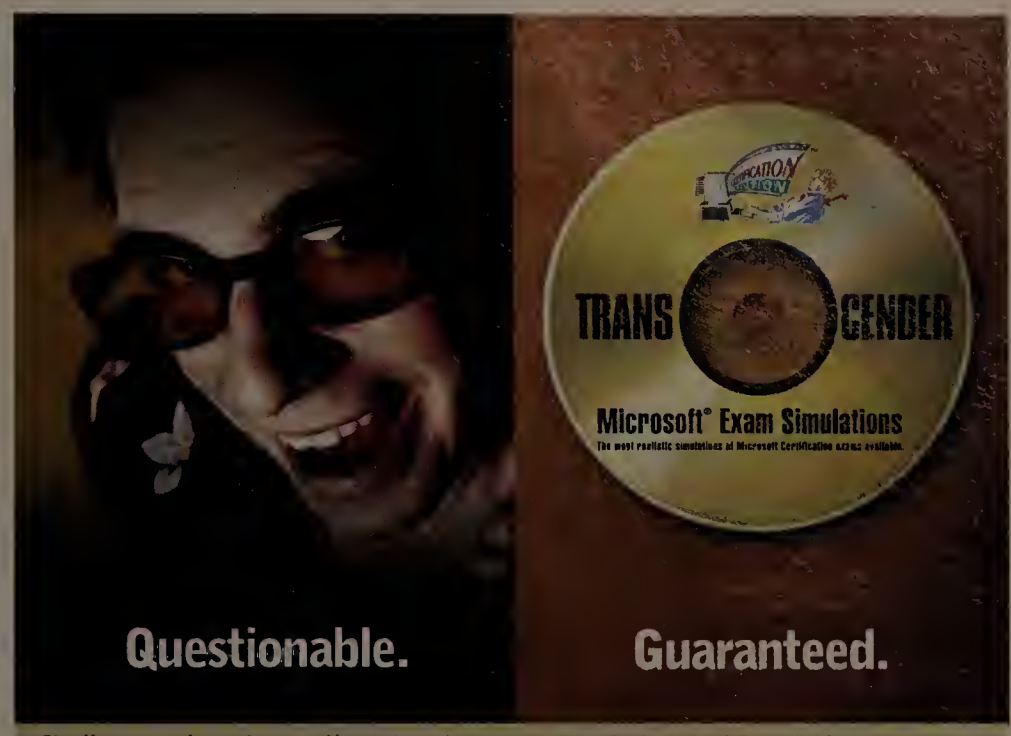

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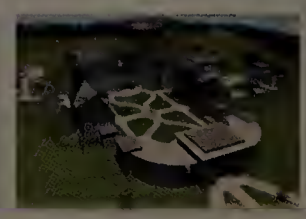

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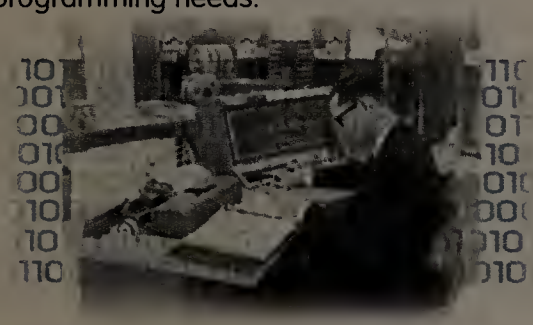

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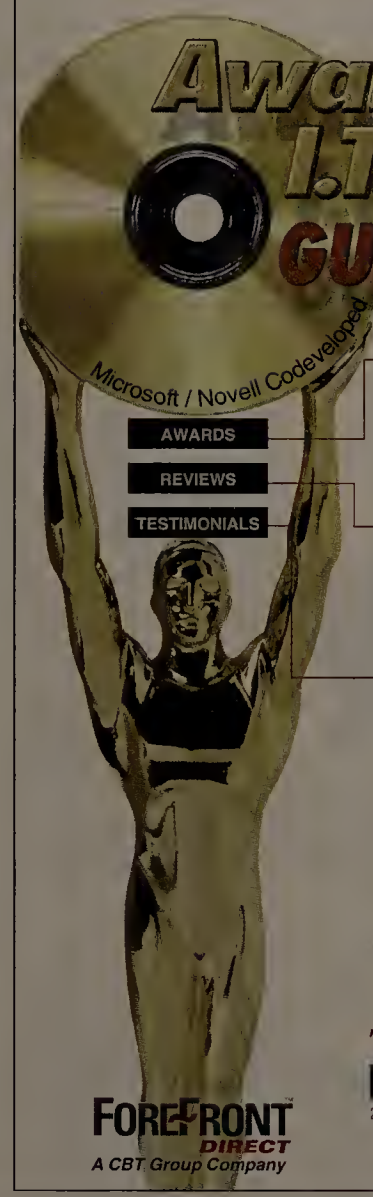

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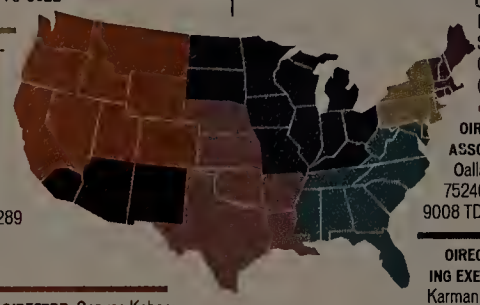

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Web Puts Retailers' Stocks in Question

But e-commerce remains essential, analysts say

BY KATHLEEN OHLSON

MERRILL LYNCH & CO. got some ink recently when it downgraded retail stocks because of the uncertain prospects of Web-based retailers facing strong competition, among other reasons. However, other analysts say this downgrade doesn't represent the true picture.

"Web-based retailing is in its infancy and sales are growing at a rapid pace, [although] the jury is still out for this holiday season," says Jeff Stein at Cleveland-based McDonald & Co. Investments Inc.

He covers Federated Department Stores Inc. (NYSE:FD), which includes Macy's, Bloomingdale's and Burdines, and put a Hold on the company, but not for Web-related reasons. He says Federated stock is "fairly valued," trading at $47 1/8, but he tells clients to wait until the price moves down.

Analysts say retailers venturing onto the Web must continue to do so; otherwise they'll be left behind, and a competitor will take their spot.

Most retailers are still experimenting with Web-based retailing — with books, music, video and computers continually edging out products such as clothes, footwear and household appliances.

But Fernanda De Clercq at Black & Co. says footwear does have a future, especially for Nordstorm Inc. (NYSE: JWN) The Seattle-based retailer spun off its e-commerce business, Nordstrom.com, creating a separate subsidiary. The site will feature more than 20 million pairs of shoes, opening in time for the holiday season.

INDUSTRY ALMANAC

De Clercq says Nordstorm once had a "laggard" inventory management system on its Web site but pushed to improved its services.

Portland, Ore.-based Black decreased its Nordstorm's earnings projections from $1.58 to $1.48 per share for the year ending January 2000, and from $1.97 to $1.87 for the year ending January 2001, because of its Web investment. Still, it placed a Buy on Nordstrom, which is trading at $27 15/16, saying Nordstrom thought out its Web strategy well. ◗

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Bloomingdales.com	Bridal registry, women's clothing, and gift items

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ADSK	49.43	21.62	Autodesk Inc.	23.44	0.13	0.5
AVID	34.25	11.06	Avid Technology	12.94	0.44	3.5
BMCS	64.87	30.00	BMC Software Inc.	56.13	0.88	1.6
BOBJ	49.50	6.12	Businesss Objects S.A.	48.50	1.88	4.0
CDN	36.00	9.12	Cadence Design Systems	13.94	1.25	9.9
CBTSY	59.62	6.68	CBT Group Plc.	22.00	-0.38	-1.7
CHKP	83.38	10.87	Checkpoint Software Tech. Ltd. (H)	83.38	7.50	9.9
CTXS	65.25	23.12	Citrix Systems Inc.	57.75	0.88	1.5
COGN	28.12	14.75	Cognos Inc.	20.00	-0.06	0.3
CA	58.00	28.75	Computer Associates Int. Inc.	55.06	2.88	5.5
CPWR	40.00	16.37	Compuware Corp.	29.50	-1.19	3.9
DCTM	54.12	9.37	Documentum	16.00	1.75	12.3
EFII	64.87	14.12	Electronics For Imaging	60.44	-0.38	-0.6
HNCS	45.62	13.75	Hnc Software	38.63	4.19	12.2
HYSL	36.12	9.87	Hyperion Software	19.28	2.03	11.8
IDXC	53.50	12.43	IDX Systems	20.50	0.19	0.9
INFA	64.50	19.00	Informatica Corp.	55.19	-2.44	-4.2
IFMX	14.00	3.75	Informix Software Inc.	7.25	-0.44	-5.7
INTU	110.75	36.25	Intuit	92.06	0.81	0.9
JKHY	55.00	26.43	Jack Henry Associates	34.00	-3.50	-9.3
JDEC	49.50	10.87	J.D. Edwards & Co.	16.94	-1.19	-6.6
LGTO	46.12	13.75	Legato Systems Inc. (H)	45.63	0.50	1.1
MACR	53.25	12.62	Macromedia Inc.	44.25	4.75	12.0
MANU	17.37	5.25	Manugistics Group Inc.	12.00	-0.63	-5.0
MENT	15.06	5.43	Mentor Graphics	9.25	0.19	2.1
MSFT	100.75	43.87	Microsoft Corp.	94.88	0.56	0.6
NETA	67.68	10.06	Network Associates	18.00	2.25	14.3
GMH	63.87	30.37	Network General	50.00	-2.81	-5.3
NOVL	31.12	7.43	Novell Inc.	24.13	0.06	0.3
ORCL	41.18	12.75	Oracle Corp.	40.56	3.31	8.9
PMTC	22.25	8.50	Parametric Technology Corp.	14.38	0.31	2.2
PSFT	35.00	11.50	PeopleSoft Inc.	14.19	-0.25	-1.7
PIXR	53.75	30.12	Pixar	33.94	-0.75	-2.2
RATL	40.00	10.87	Rational Software Corp.	29.50	0.56	1.9
RHAT	90.68	40.00	Red Hat Inc.	82.00	2.13	2.7
SAP	53.12	23.75	SAP AG	33.56	-0.56	-1.6
SCUR	29.00	2.25	Secure Computing Corp.	2.88	-0.16	-5.2
SE	46.43	19.00	Sterling Commerce Inc.	20.50	0.44	2.2
SSW	30.62	18.56	Sterling Software Inc.	20.13	-0.06	-0.3
SORC	23.43	7.50	Structural Dynamics Research	15.94	0.19	1.2
SYBS	13.37	4.50	Sybase Inc.	13.00	0.25	2.0
SYMC	34.37	8.68	Symantec Corp. (H)	32.81	4.25	14.9
SNPS	63.25	26.93	Synopsis	59.50	4.50	8.2
SCTC	22.00	7.81	Systems & Computer Technology	15.00	-0.25	-1.6
BAANF	33.12	6.87	The Baan Co. N.V.	12.63	-0.63	-4.7
VNTV	15.81	5.00	The Vantive Corp.	8.25	-0.13	-1.5
TIBX	41.37	19.75	Tibco Software Inc.	31.00	4.44	16.7
TSAI	51.00	26.00	Trans. Sys. Arch.	30.00	0.25	0.8
VRTS	64.63	11.87	Veritas Software Corp. (H)	64.63	4.63	7.7
WIND	34.43	11.25	Wind River Systems Inc.	16.00	-0.19	-1.2
TELECOMMUNICATIONS CARRIERS OFF -2.0%						
AT	75.00	40.62	Alltel Corp.	71.69	1.31	1.9
AIT	77.25	43.37	Ameritech Corp.	63.50	-2.31	-3.5
ANDW	22.87	10.37	Andrew Corp.	17.31	-0.63	-3.5
T	64.12	33.87	AT&T	48.06	-1.38	-2.8
BCE	52.68	25.62	BCE Inc.	46.19	-2.50	-5.1
BEL	66.93	40.62	Bell Atlantic	63.56	-0.88	-1.4
BLS	51.37	32.31	Bell South	44.63	-1.88	-4.0
CSN	26.50	8.50	Cincinnati Bell Inc.	18.38	-0.13	-0.7
CMCSK	42.56	19.37	Comcast	35.50	1.50	4.4
CQ	39.62	26.50	Comsat Corp.	35.19	-0.44	-1.2
COX	44.43	22.31	Cox Communications Inc.	36.31	0.19	0.5
GSTRF	33.00	8.31	Globalstar Telecom. Ltd.	24.88	-4.19	-14.4
GTE	78.50	46.56	GTE Corp.	71.63	-0.81	-1.1
NXTL	60.25	15.37	Nextel Communications (H)	60.25	3.50	6.2
SPOT	45.43	26.37	Panamsat	37.75	1.50	4.1
QCOM	198.62	18.87	Qualcomm	161.44	-25.50	-13.6
SBC	59.93	36.00	SBC Communications	48.69	-2.06	-4.1
FON	57.43	27.18	Sprint Corp.	45.69	-2.19	-4.6
TOS	79.37	30.62	Telephone and Data Systems	71.50	1.31	1.9
TNI	46.56	12.00	Transation Network Services	43.56	-1.75	-3.9
USW	66.00	47.00	US West	54.75	0.56	1.0
VIA	48.75	25.43	Viacom	44.69	0.50	1.1
WCII	64.43	10.25	Winstar Communications Inc.	51.94	-0.88	-1.7
WCOM	96.75	39.00	MCI Worldcom Inc.	77.44	-2.44	-3.1
SERVICES OFF -1.0%						
ACXM	31.25	16.50	Acxiom Corp.	17.81	3.13	-14.9
ACS	53.00	22.37	Affiliated Computer Servs	41.94	-2.06	-4.7
AMSY	40.25	19.25	American Mgt. Systems	27.88	0.38	1.4
AUD	46.87	32.68	Automatic Data Processing	40.31	0.31	0.8
BSYS	60.87	35.37	Bisys Group Inc.	46.94	-3.31	-6.6
CATP	38.25	10.62	Cambridge Technology Ptnrs	15.00	0.44	3.0
CEN	40.50	24.00	Ceridian	26.63	-1.56	-5.5
CBR	31.18	13.31	Ciber Inc.	19.00	-0.38	-1.9
CDO	30.87	10.75	Comdisco	22.13	0.13	0.6
CHRZ	31.00	9.25	Computer Horizons Corp.	13.13	-0.50	-3.7
CSC	74.87	46.25	Computer Sciences	68.56	1.38	2.0
DST	70.25	34.00	Dst Systems Inc.	66.75	-1.25	-1.8
EDS	67.37	30.43	Electronic Data Systems	57.56	0.94	1.7
FDC	51.50	19.68	First Data Group	44.63	-1.19	-2.6
FISV	40.75	24.87	Fiserv	31.88	1.63	5.4
IT	28.31	17.31	Gartner Group	22.19	0.81	3.8
KEA	50.12	17.25	Keane	21.56	-0.75	-3.4
NOC	55.25	26.18	National Data	39.31	-0.25	-0.6
PAYX	36.75	23.56	Paychex Inc.	29.94	2.94	10.9
PER	85.75	19.18	Perot Systems Corp.	20.50	-0.50	-2.4
REGI	15.06	4.00	Renaissance Worldwide	4.69	-0.50	-9.6
REY	25.31	12.68	Reynolds & Reynolds	22.56	1.19	5.6
SFE	120.00	17.12	Safegard Scientifics	68.13	3.50	5.4
SAPE	82.87	24.25	Sapient Corp.	77.75	8.13	11.7
SMS	73.50	40.06	Shared Medical Systems	56.75	0.13	0.2
SOS	41.93	21.68	Sungard Data Systems	26.13	-0.38	1.4
SYNT	24.31	7.00	Syntel Inc.	8.88	-1.00	-10.1
TECO	53.12	14.50	Tech Data	30.94	-5.81	-15.8
TENF	39.50	21.50	TenFold Corp	28.50	1.50	5.6
TSS	28.25	14.43	Total System Services Inc	15.00	0.81	5.1
TSAI	51.00	26.00	Transaction Sys. Architects	30.00	0.25	0.8
NETWORK OFF -2.4%						
COMS	51.12	20.00	3Com Corp.	26.69	0.94	3.6
AOCT	53.62	15.75	AOC Telecommunications Inc.	39.88	4.38	12.3
ANTC	50.43	11.50	Antec	45.50	-2.69	-5.6
BNYN	19.37	2.12	Banyan Systems Inc.	7.47	0.50	6.3
CS	17.50	6.87	Cabletron Systems (H)	16.88	1.75	11.6
CNEBF	11.37	3.93	Call Net Enterprises	5.69	0.53	8.5
CSCO	70.31	20.56	Cisco Systems Inc.	70.06	0.50	0.7
ECIL	45.00	19.75	ECI Telecom	27.81	-1.19	-4.1
ENTU	43.06	9.00	Entrust Technologies Inc.	22.06	-2.69	-10.9
HRS	40.62	25.62	Harris Corp. (L)	27.00	-0.19	-0.7
GMH	63.87	30.37	Hughes Electronics/GM	50.00	-2.81	-5.3
ERICY	35.25	15.00	LM Ericsson	33.00	-0.56	-1.7
JNPR	234.37	90.12	Juniper Networks Inc.	196.13	-25.88	-11.7
LU	79.75	26.68	Lucent Technologies	65.44	-1.50	-2.2
MADGF	5.18	1.75	Madge Networks	2.50	0.00	0.0
NCOI	8.50	4.25	Network Computing Dev	5.09	0.13	2.5
NWK	13.68	7.31	Network Equipment Tech. (L)	9.00	0.00	0.0
NN	39.87	15.43	Newbridge Networks	27.19	-0.50	-1.8
NOK	99.37	29.50	Nokia Corp	86.31	1.13	1.3
NT	47.06	13.37	Northern Telecom Ltd. (H)	42.44	-1.19	-2.7
PAIR	16.12	6.00	Pairgain Technologies Inc	10.06	-1.00	-9.0
PCTL	11.00	4.31	Picturetel	4.63	-0.97	-17.3
SFA	53.25	11.75	Scientific Atlanta (H)	53.25	1.63	3.1
TLAB	74.00	15.68	Tellabs Inc.	61.56	-2.44	-3.8
USW	66.00	47.00	US West	54.75	0.56	1.0
VRLK	6.37	2.00	Verilink	2.16	0.03	1.4
WSTL	11.18	2.75	Westell Technology Inc.	7.31	0.56	7.1
SEMICONDUCTORS, CHIPS & EQUIPMENT UP 5.7%						
ADPT	42.87	7.87	Adaptec	39.75	1.88	5.0
AMD	33.00	9.31	Advanced Micro Devices	21.06	1.25	6.3
ALTR	48.81	14.75	Altera	48.81	5.94	13.8
ADI	54.93	12.00	Analog Devices (H)	53.25	1.81	3.5
AMAT	79.93	21.56	Applied Materials	77.00	7.56	10.9
ASML	69.62	12.93	ASM Lithography Holding	67.88	3.63	5.6
HRS	40.62	25.62	Harris Corp. (L)	27.00	-0.19	-0.7
INTC	88.69	37.12	Intel Corp. (H)	88.69	5.56	6.7
KLAC	73.06	20.75	Kla Instruments	68.00	3.56	5.5
LLTC	75.75	19.56	Linear Technology	68.19	4.56	7.2
LSI	59.25	10.50	LSI Logic	58.38	3.13	5.7
MXIM	73.50	22.31	Maxim Integrated Products	70.00	2.63	3.9
MU	80.56	22.93	Micron Technology	79.13	9.00	12.8
MOT	100.18	38.37	Motorola	94.25	0.13	0.1
NSM	31.12	7.43	National Semiconductor (L)	30.50	1.81	6.3
STM	78.62	17.93	SGS-Thomson Microelectronics	72.44	2.06	2.9
SLR	78.93	19.37	Solectron Corp.	75.63	1.50	2.0
TER	40.25	7.50	Teradyne	40.00	5.53	16.0
TXN	86.69	22.68	Texas Instruments (H)	86.69	5.69	7.0
JOSU	120.87	15.62	Uniphase	112.94	1.44	1.3
VTSS	74.50	17.12	Vitesse Semiconductor Corp	70.75	1.13	1.6
XLNX	77.25	15.43	Xilinx	73.63	1.31	1.8
COMPUTER SYSTEMS UP 2.5%						
AAPL	71.43	28.50	Apple Computer Inc. (H)	71.31	7.31	11.4
ASPX	13.31	1.62	Auspex Systems	10.00	-0.69	-6.4
BEOS	10.93	5.87	Be Inc.	7.19	0.88	13.9
CPQ	51.25	20.00	Compaq	23.25	-0.19	-0.8
DGN	21.81	7.43	Data General	18.56	-0.25	-1.3
DELL	55.00	20.37	Dell Computer Corp.	48.94	1.50	3.2
GTW	100.37	36.12	Gateway 2000 Inc.	98.50	1.19	1.2
HWP	118.43	47.06	Hewlett-Packard Co.	108.69	2.69	2.5
HIT	109.93	40.18	Hitachi Ltd.	101.19	-2.75	-2.6
IBM	139.18	57.62	IBM	129.00	4.25	3.4
MUEI	24.75	9.00	Micron	9.94	0.22	2.3
MOT	100.18	38.37	Motorola	94.25	0.13	0.1
NATI	48.25	17.50	National Instruments Corp	29.25	-0.38	-1.3
NCR	55.75	23.50	NCR	43.69	-0.06	-0.1
NIPNY	81.75	31.00	NEC	79.38	1.00	1.3
PRCM	13.25	3.43	Procom Tech Inc.	6.81	0.06	0.9
SQNT	19.00	5.68	Sequent Computer Systems	17.83	0.00	0.0
SGI	20.87	7.37	Silicon Graphics Inc.	11.56	0.06	0.5
SNE	136.62	60.25	Sony	129.63	0.94	0.7
SUNW	83.31	19.50	Sun Microsystems (H)	83.31	5.81	7.5
TRCO	4.87	0.37	Tricord Systems	3.31	0.56	20.5
UIS	46.18	18.12	Unisys	44.63	0.38	-0.8
INTERNET OFF -2.2%						
AMZN	110.62	11.75	Amazon.com Inc.	61.88	-2.50	-3.9
AOL	175.50	20.62	America Online	96.13	-4.19	-4.2
ATHM	99.00	14.25	@home Corp.	39.25	-1.50	-3.7
CKFR	69.12	5.75	Checkfree	32.00	0.00	0.0
CYCH	24.87	5.87	Cybercash Inc.	8.81	-0.19	-2.1
EDFY	16.87	3.81	Edify Corp	13.44	1.00	8.0
EBAY	234.00	8.43	eBay Inc.	129.50	3.13	2.5
ETYS	85.00	28.12	eToys Inc.	46.00	-1.13	-2.4
EGRP	72.25	2.50	ETrade Group Inc.	24.81	-1.13	-4.3
SEEK	100.00	16.50	Infoseek	29.94	-1.44	-4.6
LCOS	72.68	11.25	Lycos Inc.	43.88	1.44	3.4
OMKT	27.00	4.25	Open Market Inc.	11.88	-0.25	-2.1
OTEX	42.50	10.00	Open Text Corp.	24.94	0.06	0.3
PCLN	165.00	58.00	Priceline.com Inc.	65.19	-8.63	-11.7
PRGY	50.62	14.00	Prodigy Communications	17.88	-3.75	-17.3
PSIX	73.75	8.37	PSINet Inc.	47.13	-3.31	-6.8
SOTI	30.62	5.43	Security Dynamics	25.13	2.06	8.9
SPYG	32.25	8.62	Spyglass Inc.	12.31	0.31	-2.5
YHOO	244.00	35.75	Yahoo Inc.	151.50	1.00	0.7
STORAGE & PERIPHERALS UP 1.9%						
ADPT	42.87	7.87	Adaptec Inc.	39.75	1.88	5.0
APCC	27.75	13.12	American Power Conversion	18.13	0.00	0.0
CANNY	33.62	17.00	Canon Inc.	29.38	0.50	1.7
DBD	39.87	19.12	Diebold Inc.	26.56	0.06	-0.2
EK	85.93	60.81	Eastman Kodak Co.	74.25	0.88	1.2
EMC	67.50	20.81	EMC	62.44	0.81	1.3
IOM	10.18	2.93	Iomega	3.44	0.06	-1.8
MXTR	21.25	4.25	Maxtor Corp.	7.19	1.06	16.2
NTAP	67.13	16.00	Network Applinace Inc	67.13	2.69	4.2
LXK	81.25	25.37	Lexmark Int. Group, Nc (H)	79.31	-0.31	-0.4
SEG	44.25	17.68	Seagate Technology	34.94	1.88	5.7
STK	41.62	17.25	Storage Technology	21.81	0.56	2.8
TEK	35.56	13.68	Tektronix (H)	33.88	0.19	0.6
XRX	63.93	39.00	Xerox	49.19	-1.06	-2.1

KEY: **(H)** = New annual high reached in period
(L) = New annual low reached in period

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E-Retailers Take Time to Nail Down Web Sites Right

combined with in-store pickup — beginning next year.

Other retailers that decided to hold back on making a big splash online until recently include Wal-Mart Stores Inc., Walgreen Co., Payless ShoeSource Inc. and Talbots Inc., all of which plan to launch new or expanded Web sites this fall, but only after buttoning down back-end ordering, inventory, shipping and returns capabilities (see chart).

Meanwhile, pure-play online retailers aren't sitting still. They, too, are bolstering back-end systems to provide their customers with even more and speedier services.

Still, other retailers have pulled the online plug altogether, at least for now, according to Donny Askin, a vice president at CommercialWare Inc., an e-commerce software company in Natick, Mass.

"We saw at least a half-dozen companies that had planned to launch online this fall for the Christmas shopping season but then decided to wait," Askin said. "There's a growing realization that if you're going to do it, you have to do it right." Otherwise, he said, companies risk damaging their brands.

"It's very important that when you create your online presence that it represents your brand," agreed Scott Silverman, an analyst at National Retail Federation in Washington.

Other experts concur. "Retailers are starting to realize that there's much more to the customer experience than a nice Web site," said Charles Gerlach, an e-commerce analyst at Mainspring Communications Inc. in Cambridge, Mass.

"If you bring a customer to your site once and give them a bad experience, they're probably gone forever," Gerlach said.

Recent outages at Internet auction site eBay Inc. are a prime example. Another is a billing glitch at Buy.com Inc. just a few months ago, Askin said. "In April, Buy.com [mistakenly] billed customers for things they didn't buy, and there was an Internet boycott of the site for about a month," he said.

It's those issues that kept J. Jill Group Inc., a $220 million Tilton, N.H.-based catalog retailer of upscale women's clothing, from launching its Internet store until last week.

"We saw a lot of companies going onto the Internet and having failures," said Andy Dow, vice president of IS at the company. Post-holiday stories about problems returning or exchanging gifts bought online only reinforced the company's decision to postpone online sales, he said.

Now, though, J. Jill is ready with an integrated inventory and ordering system that gives online shoppers real-time information about product availability. The system is also tied into the company's call center, where J. Jill workers have real-time access to Internet orders and can offer live help to shoppers online.

At $2.6 billion Payless ShoeSource in Topeka, Kan., "it never occurred to any of us not to leverage our back-end systems from the beginning," said Rhonda Wells, the director of e-commerce.

"We were never going to manually try to pencil in and keep track of inventory and online orders," Wells said.

Instead, Payless launched its Web site in July with the intent of providing all the same products and services found in its 4,400 brick-and-mortar stores. Customers who buy shoes online can return or exchange them in the stores, which are tied in to the same inventory system as the Web-based store.

On the pure-play side, Waltham, Mass.-based Toysmart.com recently beefed up its customer service capabilities by implementing a complex fulfillment system from Yantra Corp. Among other things, the new software lets Toysmart quickly fill customer orders comprised of products stored in different warehouses and being shipped to different recipients.

"The focus of these companies is shifting from customer acquisition to customer retention," said Yantra CEO Devdutt Yellurkur.

"Fulfillment is such a critical element of customer retention because every time you make a small mistake in shipping, handling or returns, it leads to customer dissatisfaction, and people don't come back," he said.

Retailing Web Site Roundup

COMPANY	WHAT'S GOING ON	DETAILS
Wal-Mart	Launching a redesigned Web site with more products this fall.	Arranged fulfillment through a partnership with Fingerhut Business Services.
Walgreen	Will launch expanded Web site in the fall. Customers can order new prescriptions online and pick up medicines at stores.	Yearlong integration project to link prescription authorization system, customer records and Web site.
Toysmart.com	Can fulfill complex orders comprising products from different warehouses and being shipped to different addresses.	Implemented new fulfillment software from Yantra Corp.

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Back Office Is First for ERP Users

For example, John Martines, vice president of the financial systems group at Reliance Insurance Group in Philadelphia, said he expects to bypass a Web-enabled upgrade of PeopleSoft's ERP applications that's due for release next year. The reason: Reliance is still working to install basic finance applications such as accounts payable and budgeting.

"We'll look at everything, but right now, we need to get our complete environment in place," Martines said. The plan is to wait for PeopleSoft's next major upgrade, which Martines doesn't expect until 2002.

Elf Atochem North America Inc., a chemicals maker in Philadelphia, is in a similar holding pattern.

Ben Vettese, director of SAP applications at Elf Atochem, said the company wants to use its R/3 system to let customers get price quotes, place orders and be billed via the Web. But it's probably a year away from being ready to do that, he said.

First, Elf Atochem needs to upgrade from the 4-year-old release of R/3 it runs now — a project that's just getting under way and likely won't be finished until next spring.

The current R/3 2.2 system won't work with SAP's online sales applications, Vettese said. Elf Atochem is writing a custom Web order-entry application as a stopgap measure, but it will require workers to manually input orders into R/3 and then communicate with customers via e-mail.

Dean Brown, a consultant at DA Consulting Group Inc., said less than 20% of the Houston-based software training firm's user clients "are ready to go forward with an actual plan" for using their ERP systems to do business online.

The need to stay focused on ongoing ERP projects makes it hard for many users to weigh all the technology choices they have for selling via the Internet, Brown said. "People love the idea, but they still need to figure out a specific path through the minefield."

Leading the Pack

Not everyone is holding back. Cybex International Inc., a maker of fitness equipment in Medway, Mass., is racing to start doing business on the Web this fall, with a combination of PeopleSoft's ERP system and an online sales application developed by the vendor.

Cybex postponed a planned rollout of PeopleSoft's human resources software to speed up the e-commerce project, said Thor Wallace, the company's CIO. But he added that integrating the online piece with the rest of the ERP system was a priority for Cybex because the back-office applications hold key information such as order and inventory data.

But Jake Mendelsohn, CIO at Petsmart Inc., said the Phoenix-based pet supplies retailer is just starting to think about possible ties between its new SAP R/3 system and the Internet.

Petsmart just went live with the SAP software in July, and its first foray into e-commerce doesn't involve R/3. Mendelsohn said one of his to-do items at SAP's Sapphire '99 user conference in Philadelphia next week will be to look "at where SAP is going [in e-commerce] and whether it has any relevance to what we're doing."

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FRANK HAYES/FRANKLY SPEAKING

Do as we say . . .

THE STORY YOU ARE ABOUT TO READ is true. The names and serial numbers have been filed off, but you'll figure out who it is soon enough. The moral of the story is that even when IT people do exactly what users ask, sometimes nobody ends up happy. But you've probably figured that out already.

Monday, 6 p.m.: The company that publishes a well-known weekly newspaper for IT leaders begins a mass e-mailing. The mailing — 68,000 messages, each containing a very large Adobe Acrobat attachment — goes out despite the concerns of the IT services manager that the gigabytes of spam could slow internal network traffic. No problem, say the marketing managers planning the e-mail blitz; we'll do it at night.

8 p.m.: The unattended e-mail server runs out of disk space. For the rest of the night, nothing goes out and nothing comes in.

Tuesday, 7 a.m.: E-mail bottleneck is cleared. Messages begin to flow again.

7:05 a.m.: All other network traffic slams to a halt.

7:15 a.m.: Early risers trying to access the newspaper's Web site discover they can't get the home page to finish loading. Images? Forget it. Many pages on the site won't come across the Internet at all.

7:55 a.m.: Newspaper editorial employees begin to arrive and log on to the network.

8 a.m.: Help desk phones start ringing off the hook.

9 a.m.: Reporters trying to use the Web to research stories that have noon deadlines are effectively blocked from the Internet. Research librarian's phone starts ringing off the hook.

9:45 a.m.: Research librarian calculates that her slow Internet connection has already created a backlog of eight hours' work.

10:20 a.m.: During coffee break, office staff organizes impromptu lynching party for IT staff. Managers insist no lynchings can take place until after the noon news deadline.

10:45 a.m.: Help desk, in full duck-and-cover mode, fortifies its area.

11:05 a.m. (8:05 a.m. Pacific time): Newspaper staff in West Coast bureaus log on to verrrrry slow downloads from Notes mail servers. They can't access the newspaper's Web site at all.

12:30 p.m.: At lunch break, word begins to get around on the source of the network bottleneck. Lynching party for IT staff is postponed. Instead, letter-bomb-writing campaign aimed at marketing department is hastily organized. Managers insist no incendiary devices can be mailed until reporters file their stories.

1:15 p.m.: Interoffice mail delayed due to several suspicious packages addressed to marketing managers.

2:30 p.m. (11:30 a.m. Pacific time): West Coast reporters discover that AOL Instant Messenger, their standard way of communicating with editors, is useless because the East Coast editors can no longer log on to the system.

Reporters organized a lynching party for the IT staff.

4 p.m.: More details of the mass e-mailing leak out, including rumors that each attachment was half a megabyte in size. One cranky Back Page columnist estimates that as much as 75% of the gigabytes of spam will be blocked by Internet service providers or will be unreadable by recipients who don't have Adobe Acrobat installed.

6 p.m.: As office staff departs, help desk workers emerge and begin to dismantle sandbags used to build makeshift bunker.

Wednesday, 10:30 a.m.: IT services manager confirms that the spamstorm is over. Swears that next time, he'll force marketing to send small e-mail messages that include a link to an online presentation on the Web. Of the 68,000 pieces of e-mail, 30,000 remain undelivered. This time, the IT services manager vows, they really *will* all be sent at night. ◗

Hayes, Computerworld's staff columnist, has covered IT for 20 years. His e-mail address — when e-mail is getting through — is frank_hayes@computerworld.com.

SHARK TANK

USER CONFERENCE, New Orleans. Things get ugly on Bourbon Street. Women baring their breasts for beads. Strippers outside their clubs, enticing conventioneers. And middle-aged PeopleSoft users hoisting beers and singing along ("intensely," a pilot fish reports) to AC/DC's "Dirty Deeds Done Dirt Cheap" blasting from a bar. At least PeopleSoft President Craig Conway has his conference priorities right. Quoth Conway, "We're just hoping to get through this week with no arrests." (For more on this shindig, see page 6.)

ANDY GROVE called his book *Only the Paranoid Survive*. Exhibit A: A Tankster swears that when the company recently briefed analysts on its IA-64 chips, everyone – from big-ticket Gartner Groupies to lowly reportwriters – had to make like they were at an airport and file through a metal detector. Intel was scared somebody would smuggle a tape recorder in. Is a new black market springing up? Are people swapping bootleg tapes of vendors lying about why their stuff is late? Could be the next big thing in comedy recordings, the Shark supposes.

ORDER A PC online from Dell and you get the usual lawyer language: "Prices. . . subject to change without notice. . . Dell will not be responsible for. . . errors or omissions." Dell really means it. Pete, a Friend of the Tank, ordered $1,984 worth of Dell PC on Saturday. On Monday, Dell said, Oops ("temporary programming errors on our online server"), make that $2,437. By my calculation, that's off 23%. By Pete's calculation – he's a VP and 20-year IT vet – his personal experience will affect his professional selections.

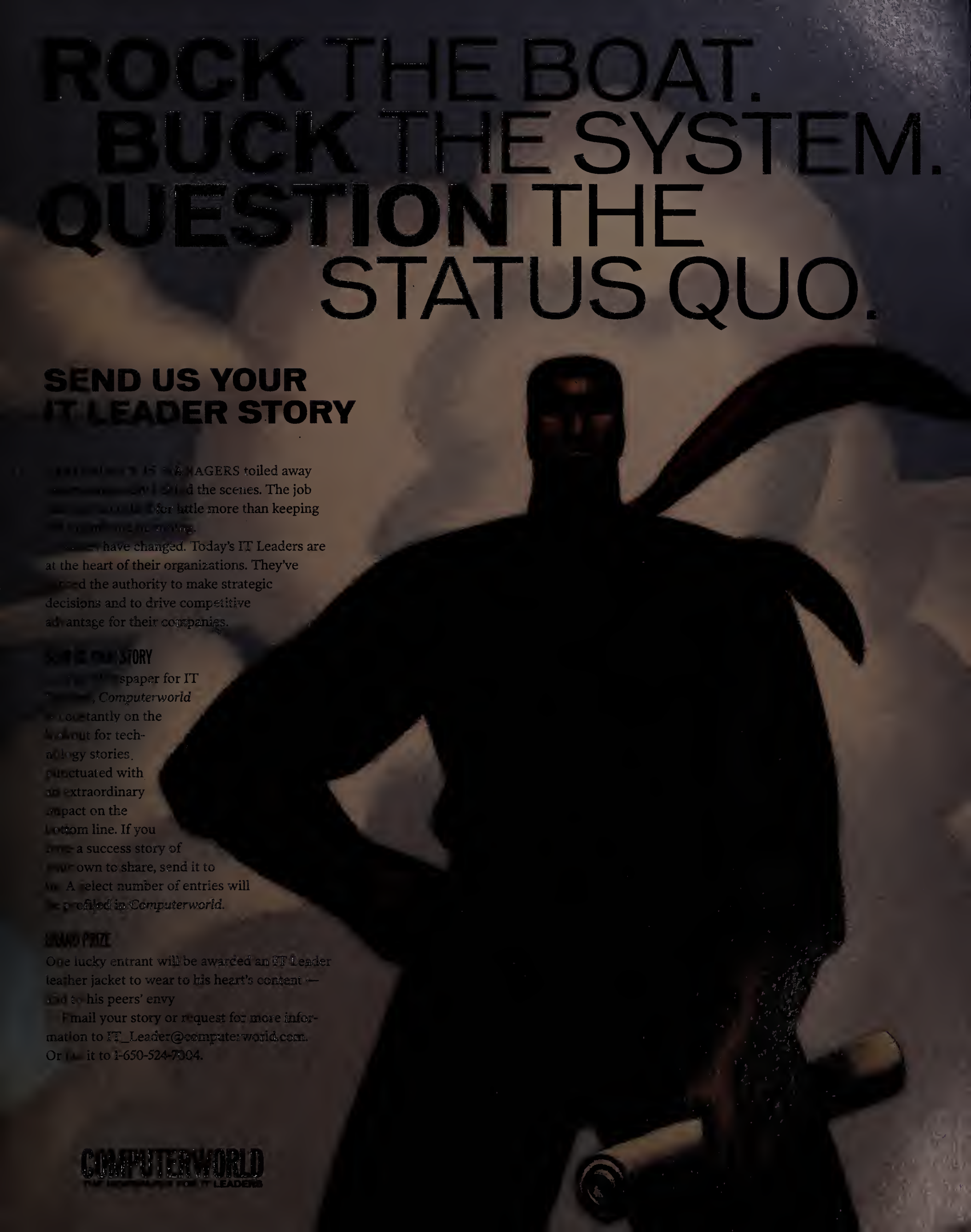
SPEAKING OF EATING You know how Microsoft talks about using its own products, calling it "eating our own dog food"? A Tankster recently briefed by IBM reports that Big Blue, more demurely, says they "eat their own cooking." Well, la-di-da.

Sharky spends Labor Day eating his own barbecue. But he's still hungry. For dirt: **sharky@computerworld.com.**

The 5th Wave

E-mail Rich Tennant at the5wave@tiac.net

"I'm sure there will be a good job market when I graduate. I created a virus that will go off that year."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